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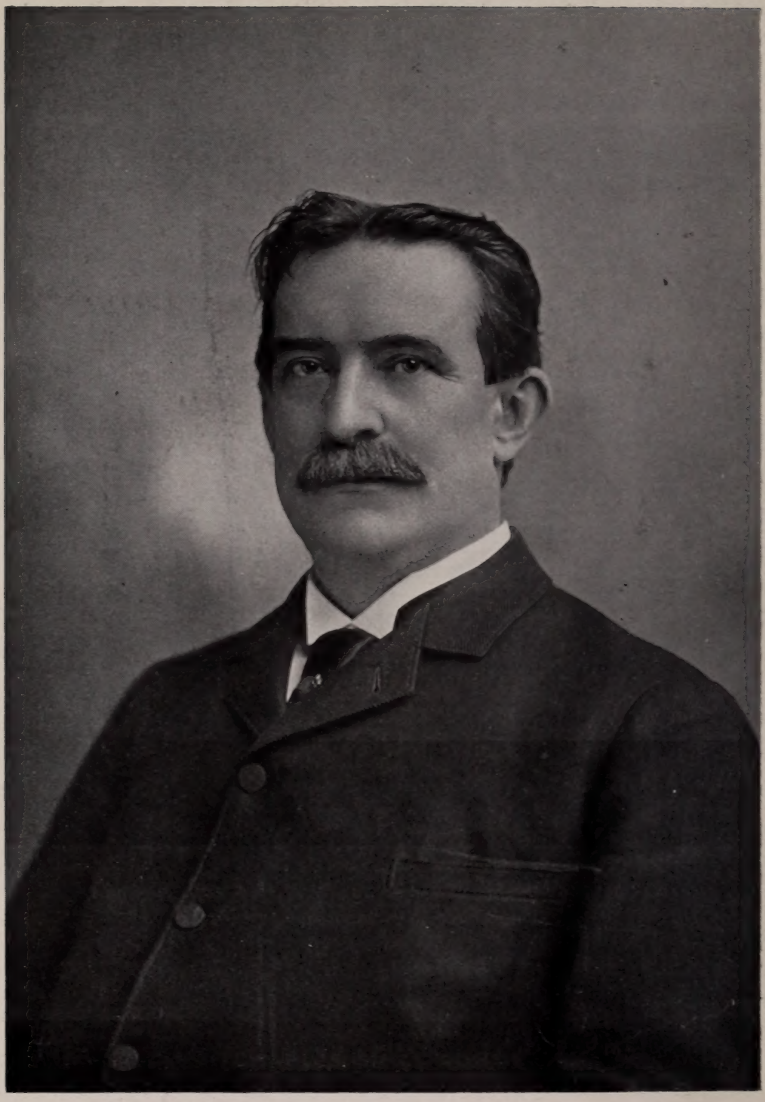

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Born at Obernkirchen, Schaumberg, Germany, March 12, 1843. Died at Baltimore, Md., December 9, 1911. Joined the American Pharmaceutical Association, 1863; Local Secretary, 1889–90; Second Vice-President, 1890–91; First Vice-President, 1895; President, 1889, and for twelve years member of the Council.

CARL SVANTE NICANOR HALLBERG

Born at Helsingborg, Sweden, October 13, 1856. Died at Chicago, Ill., October 22, 1910. Became a member of the American Pharmaceutical Association in 1879. Member of the Committee on National Formulary from 1886 to the time of his death; Chairman of the Section on Scientific Papers, 1891–92; Chairman of the Section on Education and Legislation, 1895–96; Editor of A. Ph. A. Bulletin from its foundation in 1906 to the time of his death.

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OF THE

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PHARMACEUTICAL ASSOCIATION

INCLUDING THE

REPORT ON THE PROGRESS OF PHARMACY TO JANUARY 1, 1912.

ALSO THE

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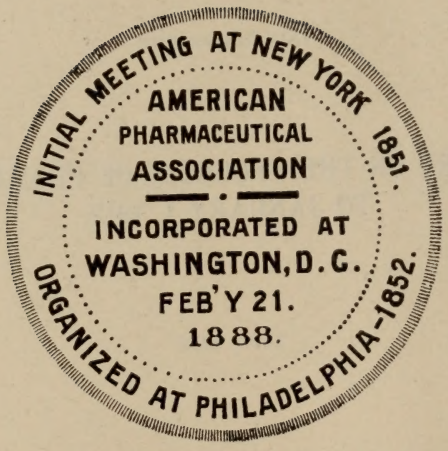
SCIO, OHIO:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1912.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Oklahoma. Foress B. Lillie, Guthrie; H. D. Kniseley, Checotah.

Oregon. John A. Laue, Portland; G. C. Blakeley, The Dalles.

Pennsylvania. Joseph W. England, Philadelphia; W. L. Cliffe, Philadelphia; W. McIntyre, Philadelphia; E. Fullerton Cook, Philadelphia; Julius A. Koch, Pittsburgh.

Rhode Island. W. O. Blanding, Providence; James O'Hare, Providence.

South Carolina. G. W. Evans, Anderson.

South Dakota. Irwin A. Keith, Lake Preston; E. C. Bent, Dell Rapids.

Tennessee. John T. McGill, Nashville; William R. White, Nashville; F. W. Mayo, Memphis.

Texas. Jacob Schrodt, Dallas; Robert H. Walker, Gonzales; R. H. Needham, Fort Worth.

Utah. F. A. Druehl, Salt Lake City; Otto R. Peters, Salt Lake City.

Vermont. E. W. Gilman, Marshfield; W. E. Terrill, Montpelier; W. H. Zottman, Burlington.

Virginia. Charles B. Fleet, Lynchburg; T. A. Miller, Richmond.

Washington. C. W. Johnson, Seattle; Cornelius Osseward, Seattle; P. Jensen, Tacoma.

West Virginia. John Coleman, Wheeling; George O. Young, Buckhannon.

Wisconsin. Edward Williams, Madison; Edward Hebbard, La Crosse; Henry Z. Ruenzel, Milwaukee.

Wyoming. Arthur Neville, Fort Mackenzie.

Hawaiian Islands. Samuel Louis Rumsey, Honolulu.

Province of Manitoba. H. E. J. Bletcher, Winnipeg.

Province of New Brunswick. M. V. Paddock, St. John.

Province of Nova Scotia. F. C. Stimson, Halifax.

Province of Ontario. C. F. Heebner, Toronto.
Province of Quebec. J. E. Morrison, Montreal.
Cuba. José Guillermo Diaz, Havana; José P. Alacan, Havana.
Alaska. Guy L. Smith, Douglas.
Philippine Islands. Newton C. Comfort, Manila.
Porto Rico. Fred. C. Baum, San Juan.

NATIONAL ASSOCIATIONS OF BOARDS OF PHARMACY.

OFFICERS FOR 1911–1912.

President—R. H. WALKER ..... Gonzales, Tex.
First Vice-President—D. F. DAVIS ..... Barre, Vt.
Second Vice-President—H. L. HAUSSAMAN ..... Grafton, N. D.
Third Vice-President—L. C. LEWIS ..... Tuskegee, Ala.
Secretary-Treasurer—A. F. SALA ..... Winchester, Ind.

EXECUTIVE COMMITTEE.

J. B. BOND, 1912 (Chairman) ..... Little Rock, Ark.
T. A. MILLER, 1913, Richmond, Va.
C. E. ZINN, 1914, Kansas City, Mo.
R. H. WALKER (*ex-officio.*).
A. F. SALA (*ex-officio*).

SYLLABUS COMMITTEE.

W. H. RUDDER, Salem, Ind. ..... (7 years).
E. O. ENGSTROM, Pittsfield, Mass. ..... (6 years).
S. L. HILTON, Washington, D. C. ..... (5 years).
CHARLES GEITNER, St. Louis, Mo. ..... (4 years).
CHAS. T. HELLER, St. Paul, Minn. ..... (3 years).
D. F. JONES, Watertown, S. D. ..... (2 years).
C. O. BIGELOW, New York City ..... (1 year).

QUESTIONS AND METHODS COMMITTEE.

H. L. HAUSSAMAN (Chairman) ..... Grafton, N. D.
WM. C. POWELL, Snow Hill, Md.
C. H. AVERY, Chicago, Ill.
F. W. BUCKNAM, Skowhegan, Me.

LEGISLATION COMMITTEE.

J. C. BURTON (Chairman) ..... Stroud, Okla.
ED. J. RODGERS, Port Huron, Mich.
A. J. FISCHER, Santa Fe, N. M.
C. O. BALLOU, Boise, Idaho.
F. W. WARD, Memphis, Tenn.

COMMITTEE TO ARRANGE RECIPROCAL INTERCHANGE WITH CUBA.

E. BERGER (Chairman) ..... Tampa, Fla.
J. F. DOWDY, Little Rock, Ark.
H. L. HAUSSAMAN, Grafton, N. D.

PUBLICATION COMMITTEE.

S. L. BRESLER ..... Denver, Colo.

AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES.

OFFICERS FOR 1911–1912.

President—J. O. SCHLOTTERBECK ..... Ann Arbor, Mich.
Vice-President—A. H. CLARK ..... Chicago, Ill.
Secretary-Treasurer—CHAS. W. JOHNSON ..... Seattle, Wash.

Executive Committee.

J. A. KOCH (Chairman) ..... Pittsburgh, Pa.
E. J. EBERLE, Dallas, Texas.
J. M. GOOD, St. Louis, Mo.
E. H. LA PIERRE, Boston, Mass.
W. J. TEETERS, Iowa City, Iowa.

MEMBERS ON NATIONAL SYLLABUS COMMITTEE.

C. B. LOWE ..... Term ends 1912
W. C. ANDERSON ..... Term ends 1913
J. A. KOCH ..... Term ends 1914
J. A. SCHLOTTERBECK ..... Term ends 1915
H. H. RUSBY ..... Term ends 1916
J. H. BEAL ..... Term ends 1917
C. W. JOHNSON ..... Term ends 1918

LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852..	Philadelphia, Pa....	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	*Samuel M. Colcord*, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853..	Boston, Mass	*William A. Brewer*, Boston.	*George D. Coggeshall*, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.....	*William B. Chapman*, Cincinnati.	*Henry T. Cummings*, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855..	New York, N. Y....	*John Meakim*, New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md.....	*George W. Andrews*. Baltimore.	*John I. Kidwell*, Washington, D. C.	*Frederick Stearns*, Detroit, Mich.	*Henry T. Kiersted*, New York.
Sept. 8, 1857..	Philadelphia, Pa....	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C...	*John I. Kidwell*, Georgetown, D. C.	*Edward R. Squibb*, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.....	*Samuel M. Colcord*, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y....	*Henry T. Kiersted*, New York.	*William J. M. Gordon*, Cincinnati.	*William S. Thompson*, Baltimore.	*Theodore Metcalf*, Boston.
Aug. 27, 1862..	Philadelphia, Pa....	*Wm. Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massot*, St. Louis.	*J. Faris Moore*, Baltimore,
Sept. 8, 1863..	Baltimore, Md.. ...	*J. Faris Moore*, Baltimore.	*John M. Maisch*, Philadelphia.	*Chas. A. Tufts*, Dover, N. H.	*George W. Weyman*, Pittsburg.
Sept. 21, 1864..	Cincinnati, O.....	*William J. M. Gordon*, Cincinnati.	*Richard H. Stabler*, Alexandria.	*Enno Sander*, St. Louis.	*Thomas Hollis*, Boston.

LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1865..	Boston, Mass.....	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	*Charles A. Heinitsh*, Lancaster, Pa.
Aug. 22, 1866..	Detroit, Mich.....	*Frederick Stearns*, Detroit, Mich.	*Edward Parrish*, Philadelphia.	*Ezekiel H. Sargent*, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867..	New York, N. Y....	*John Milhau*, New York.	*Robert J. Brown*, Leavenworth, Kan.	*N. Hynson Jennings*, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868..	Philadelphia, Pa....	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	*Albert E. Ebert*, Chicago.
Sept. 7, 1869..	Chicago, Ill.....	*Ezekiel H. Sargent*, Chicago.	*Ferdinand W. Sennewald*, St. Louis.	*John H. Pope*, New Orleans.	*Joel S. Orne*, Cambridgeport, Mass.
Sept. 13, 1870..	Baltimore, Md.....	*Richard H. Stabler*, Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871..	St. Louis, Mo.....	*Enno Sander*, St. Louis.	C. Lewis Diehl, Louisville, Ky.	*George F. H. Markoe*, Boston.	*Matthew F. Ash*, Jackson, Miss.
Sept. 3, 1872..	Cleveland, O.	*Albert E. Ebert*, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	*Henry C. Gaylord*, Cleveland, O.
Sept. 16, 1873..	Richmond, Va.....	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874..	Louisville, Ky.....	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	*Augustus R. Bayley*, Cambridgeport, Mass.
Sept. 7, 1875..	Boston, Mass.....	*George F. H. Markoe*, Boston.	*Frederick Hoffmann*, New York.	*T. Roberts Baker*, Richmond, Va.	*Christian F. G. Meyer*, St. Louis.
Sept. 12, 1876..	Philadelphia, Pa....	*Charles Bullock*, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	*Jacob D. Wells*, Cincinnati.
Sept. 4, 1877..	Toronto, Can.....	William Saunders, London, Ont.	*Ewen McIntyre*, New York.	*John Ingalls*, Macon, Ga.	*Emlen Painter*, San Francisco.

LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Nov. 26, 1878..	Atlanta, Ga.....	*Gustavus J. Luhn*, Charleston, S. C.	*Frederick T. Whiting*, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879..	Indianapolis, Ind...	*George W. Sloan*, Indianapolis, Ind.	*T. Roberts Baker*, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	*Philip C. Candidus*, Mobile, Ala.
Sept. 14, 1880..	Saratoga, N. Y.	*James T. Shinn*, Philadelphia.	George H. Schafer, Fort Madison, Ia.	*William S. Thompson*, Washington, D. C.	*William Simpson*, Raleigh, N. C.
Aug. 23, 1881..	Kansas City, Mo....	*P. Wendover Bedford*, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	*John F. Judge*, Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y.	*Charles A. Heinitsh*, Lancaster, Pa.	*John Ingalls*, Macon, Ga.	*Louis Dohme*, Baltimore,	*William B. Blanding*, Providence, R. I.
Sept. 11, 1883..	Washington, D. C...	*William S. Thompson*, Washington, D. C.	*Charles Rice*, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis....	*John Ingalls*, Macon, Ga.	*John A. Dadd*, Milwaukee, Wis.	*Henry Canning*, Boston.	*Charles F. Goodman*, Omaha, Neb.
Sept. 8, 1885..	Pittsburg, Pa.....	*Joseph Roberts*, Baltimore.	Albert H. Hollister, Madison, Wis.	*Albert B. Prescott*, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I....	*Chas. A. Tufts*, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	*M. W. Alexander*, St. Louis.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887..	Cincinnati, O.....	John U. Lloyd, Cincinnati.	*M. W. Alexander*, St. Louis.	*A. K. Finlay*, New Orleans.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888..	Detroit, Mich.....	*M. W. Alexander*, St. Louis.	Jas. Vernor, Detroit, Mich.	*Fred. Wilcox*, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal..	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	*Wm. M. Searby*, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890..	Old Pt. Comfort, Va.	*A. B. Taylor*, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	*Chas. E. Dohme*, Baltimore.	Jas. M. Good, St. Louis.

LIST OF OFFICERS (Continued.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
April 27, 1891..	New Orleans, La....	*A. K. Finlay*, New Orleans.	*Geo. J. Seabury*, New York.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892..	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	*Sidney P. Watson*, Atlanta, Ga.	*Wm. H. Averill*, Frankfort, Ky.
Aug. 14, 1893..	Chicago, Ill.....	Edgar L. Patch, Boston.	*Leo Eliel*, South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore.
Sept. 3, 1894..	Asheville, N. C.....	*William Simpson*, Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.
Aug. 14, 1895..	Denver, Colo.....	James M. Good, St. Louis.	*Chas. E. Dohme*, Baltimore.	Adolph Brandenberger, Jefferson City, Mo.	Mrs. M. O. Miner, Hiawatha, Kan.
Aug. 12, 1896..	Montreal, Can.....	Joseph E. Morrison, Montreal, Can.	Geo. F. Payne, Atlanta, Ga.	Wm. A. Frost, St. Paul, Minn.	Geo. W. Parisen, Perth Amboy, N. J.
Aug. 23, 1897..	Lake Minnetonka, Minn.....	*Henry M. Whitney*, Lawrence, Mass.	George C. Bartells, Camp Point, Ill.	*Wm. S. Thompson*, Washington, D. C.	*Jacob A. Miller*, Harrisburg, Pa.
Aug. 29, 1898..	Baltimore, Md.....	*Charles E. Dohme*, Baltimore.	George F. Payne, Atlanta, Ga	James H. Beal, Scio, O.	Miss Josie A. Wanous, Minneapolis, Minn.
Sept. 4, 1899..	Put-in Bay, O.....	*Albert B. Prescott*, Ann Arbor, Mich.	Lewis C Hopp, Cleveland, O.	Wm. L. Dewoody, Pine Bluff, Ark.	Henry R. Gray, Montreal, Can.
May 7, 1900..	Richmond, Va	Jno. F. Patton, York, Pa.	James H. Beal, Scio, O.	Jno. W. Gayle, Frankfort, Ky.	E. A. Ruddiman, Nashville, Tenn.
Sept. 16, 1901..	St. Louis, Mo.....	Henry M. Whelpley, St. Louis.	*Wm. M. Searby*, San Francisco.	George F. Payne, Atlanta, Ga.	*Wm. S. Thompson*, Washington, D. C.
Sept. 8, 1902..	Philadelphia, Pa....	Geo. F. Payne, Atlanta, Ga.	Wm. L. Cliffe, Philadelphia, Pa.	Eugene G. Eberle, Dallas, Tex.	Henry Willis, Quebec, Can.
Aug. 3, 1903..	Mackinac Island, Mich.....	Lewis C. Hopp, Cleveland, O.	Wm. C. Alpers, New York.	Albert M. Roehrig, Stapleton, N. Y.	Otto F. Claus, St. Louis, Mo.

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1904..	Kansas City, Mo....	James H. Beal, Scio, O.	*Philip C. Candidus*, Mobile, Ala.	Wm. Mittelbach, Boonville, Mo.	Julius A. Koch, Pittsburg, Pa.
Sept. 4, 1905..	Atlantic City, N. J..	Jos. L. Lemberger, Lebanon, Pa	Chas. Holzhauer, Newark, N. J.	Chas. A. Rapelye, Hartford, Conn.	Fabius C. Godbold, New Orleans, La.
Sept. 3, 1906..	Indianapolis, Ind...	*Leo Eliel*, South Bend, Ind.	Wm. Mittelbach, Boonville, Mo.	*C. S. N. Hallberg*, Chicago, Ill.	*Thomas P. Cook*, New York, N. Y.
Sept. 2, 1907..	New York, N. Y....	*Wm. M. Searby*, San Francisco, Cal.	Oscar Oldberg, Chicago, Ill.	Henry H. Rusby, New York, N. Y.	Oscar W. Bethea, Meridian, Miss.
Sept. 7, 1908..	Hot Springs, Ark...	Oscar Oldberg, Chicago, Ill.	Eugene G. Eberle, Dallas, Tex.	Wm. Mittelbach, Boonville, Mo.	James H. Beal, Scio, O.
Aug. 16, 1909..	Los Angeles, Cal...	Henry H. Rusby, Newark, N. J.	Clement B. Lowe, Philadelphia, Pa.	Chas. W. Johnson, Seattle, Wash.	Wm. B. Day, Chicago, Ill.
May, 2, 1910.	Richmond, Va.	Eugene G. Eberle, Dallas, Tex.	Wm. B. Day, Chicago, Ill.	Otto F. Claus, St. Louis, Mo.	Leonard A. Seltzer, Detroit, Mich.
Aug. 14, 1911..	Boston, Mass.....	John G. Godding, Boston, Mass.	W. Bodemann, Chicago, Ill.	Chas. M. Ford, Denver, Col.	Ernest Berger, Tampa, Fla.

HONORARY PRESIDENTS.

Philip C. Candidus, Mobile, Ala., 1907–08.
Samuel A. D. Sheppard, Boston, Mass., 1908–09.
Enno Sander, St. Louis, Mo., 1909–1910.
Ewen McIntyre, New York, N. Y., 1910-1911.
Henry Biroth, Chicago, Ill., 1911–1912.

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall, New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, Md , 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–1908.
Henry M. Whelpley, St. Louis, 1908–1912.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65.

CORRESPONDING SECRETARIES.

William Procter, Jr., 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–1854.
Edward Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–65.
John M. Maisch, Philadelphia, 1862–63.
John M. Maisch, Philadelphia, 1865–Sept., 1893.

PERMANENT SECRETARIES.

Henry M. Whelpley, St. Louis (acting), August, 1893.
Joseph P. Remington, Philadelphia, 1893–94.
Chas. Caspari, Jr., Baltimore, 1894–96.
Chas. Caspari, Jr., Baltimore, 1896–1912.

GENERAL SECRETARIES.

James H. Beal, Scio, Ohio, 1911–1912.

LOCAL SECRETARIES.

For the meeting held in		For the meeting held in		For the meeting held in	
1867	*P. Wendover Bedford.*	1883	Charles Becker.	1898	Henry P. Hynson.
1868	*Alfred B. Taylor.*	1884	Henry C. Schranck.	1899	Lewis C. Hopp.
1869	*Henry W. Fuller.*	1885	*George A. Kelly.*	1900	T. Ashby Miller.
1870	*J. Faris Moore.*	1886	*William B. Blanding.*	1901	H. M. Whelpley.
1871	*William H. Crawford.*	1887	*George W. Voss.*	1902	Wm. L. Cliffe.
1872	*Henry C. Gaylord.*	1888	James Vernor.	1903	F. W. R. Perry.
1873	Thomas H. Hazard.	1889	Edward W. Runyon.	1904	Joseph C. Wirthman.
1874	*Emil Scheffer.*	1890	*Charles E. Dohme.*	1905	Wm. C. Wescott.
1875	Samuel A. D. Sheppard.	1891	*A. K. Finlay.*	1906	Frank H. Carter.
1876	Adolphus W. Miller.	1892	*H. M. Whitney.*	1907	*Thos. P. Cook.*
1877	Henry J. Rose.	1893	*Henry Biroth.*	1908	Martin A. Eisele.
1878	*Jesse W. Rankin.*	1894	W. G. Smith.	1909	Thos. W. Jones.
1879	*Eli Lilly.*	1895	Edm. L. Scholtz.	1910	T. Ashby Miller.
1880	Charles F. Fish.	1896	Joseph E. Morrison.	1911	C. Herbert Packard.
1881	William T. Ford.	1897	Edw. Shumpik.	1912	Chas. M. Ford.
1882	*Hiram E. Griffith.*				

REPORTERS ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91, and 1895–1912. *Chas. Rice*, New York, N. Y., 1891–92. Henry Kraemer, Philadelphia, Pa., 1892–95.

PAST AND PRESENT OFFICERS OF THE SECTIONS.

SECTION ON COMMERCIAL INTERESTS.

	Chairman.	*Secretary.*
1887–88	A. H. Hollister.	*J. W. Colcord.*
1888–89	" "	" "
1889–90	*Leo Eliel.*	F. B. Kilmer.
1890–91	*Henry Canning.*	W. L. Dewoody.
1891–92	W. H. Torbert.	Arthur Bassett.
1892–93	" "	" "
1893–94	Wiley Rogers.	Jas. O. Burge.
1894–95	*Geo. J. Seabury.*	" "
1895–96	" "	Clay W. Holmes.
1896–97	Lewis C. Hopp.	E. D'Avignon.
1897–98	Joseph Jacobs.	Jas. H. Bobbitt.
1898–99	" "	" "
1899–00	Jas. M. Good.	Chas. A. Rapelye.
1900–01	Chas. A. Rapelye.	F. W. Meissner.
1901–02	F. W. Meissner.	E. G. Eberle.
1902–03	Thos. V. Wooten.	Wm. C. Anderson.
1903–04	Wm. L. Dewoody.	Robert C. Reilly.
1904–05	Chas. R. Sherman.	" "
1905–06	Henry P. Hynson.	Herman D. Kniseley.
1906–07	Herman D. Kniseley.	Chas. H. Avery.
1907–08	Jacob Diner.	George O. Young.
1908–09	Harry B. Mason.	Erich H. Ladish.
1909–10	Waldo M. Bowman.	G. H. P. Lichthardt.
1910–11	Franklin M. Apple.	Benj. E. Pritchard.
1911–12	Ernest Berger.	R. W. Ramsaur.

SECTION ON SCIENTIFIC PAPERS.

	Chairman.	*Secretary.*
1887–88	*T. Roberts Baker.*	A. B. Lyons.
1888–89	*Emlen Painter.*	H. M. Whelpley.
1889–90	H. M. Whelpley.	C. F. Dare.
1890–91	E. L. Patch.	*C. S. N. Hallberg.*
1891–92	*C. S. N. Hallberg.*	H. W. Snow.
1892–93	C. T. P. Fennel.	F. G. Ryan.
1893–94	L. E. Sayre.	C. M. Ford.
1894–95	A. R. L. Dohme.	Geo. B. Kauffman.
1895–96	P. Sadtler.	W. C. Alpers.
1896–97	W. C. Alpers.	V. Coblentz.
1897–98	Edward Kremers.	A. B. Lyons.
1898–99	Henry H. Rusby.	H. V. Arny.
1899–00	Frank G. Ryan.	Caswell A. Mayo.
1900–01	Oscar Oldberg.	Lyman F. Kebler.
1901–02	Lyman F. Kebler.	Jos. W. England.
1902–03	J. O. Schlotterbeck.	" "
1903–04	Wm. A. Puckner.	Eustace H. Gane.
1904–05	Eustace H. Gane.	Chas. E. Caspari.
1905–06	Chas. E. Caspari.	Daniel Base.
1906–07	Reid Hunt.	Virgil Coblentz.
1907–08	Virgil Coblentz.	Chas. E. Vanderkleed.
1908–09	Chas. E. Vanderkleed.	Martin I. Wilbert.
1909–10	Martin I. Wilbert.	Albert H. Clark.
1910–11	Albert H. Clark.	Wm. O. Richtmann.
1911–12	W. O. Richtmann.	Chas. H. LaWall.

SECTION ON PHARMACEUTICAL EDUCATION.

	Chairman.	*Secretary.*
1887-88	*John F. Judge.*	H. M. Whelpley.
1888-89	*P. W. Bedford.*	L. E. Sayre.

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

	Chairman.	*Secretary.*
1889-90	*P. W. Bedford.*	A. B. Stevens.
1890-91	Wm. Simon.	L. C. Hogan.
1891-92	A. B. Stevens.	" "
1892-93	R. G. Eccles.	" "
1893-94	" "	" "
1894-95	Jas. M. Good.	*C. S. N. Hallberg.*
1895-96	*C. S. N. Hallberg.*	Jas. H. Beal.
1896-97	" "	" "
1897-98	Jas. H. Beal.	H. Gordon Webster.
1898-99	A. B. Lyons.	C. B. Lowe.
1899-00	C. B. Lowe.	J. A. Koch.
1900-01	" "	" "
1901-02	E. G. Eberle.	J. W. T. Knox.
1902 03	J. W. T. Knox.	Harry B. Mason.
1903-04	Harry B. Mason.	Wm. L. Cliffe.
1904-05	" "	" "
1905-06	Oscar Oldberg.	Jos. W. England.
1906-07	" "	" "
1907-08	Jos. W. England.	Chas. H. LaWall.
1908-09	" "	" "
1909-10	Chas. H. LaWall.	Chas. W. Johnson.
1910-11	Chas. W. Johnson.	W. J. Teeters.
1911-12	John C. Wallace.	" "

SECTION ON PHARMACEUTICAL LEGISLATION.

	Chairman.	*Secretary.*
1887-88	R. F. Bryant.	W. P. De Forest.
1888-89	C. W. Day.	J. N. Hurty.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

	Chairman.	*Secretary.*
1900-01	Henry P. Hynson.	F. W. E. Stedem.
1901-02	F. W. E. Stedem.	Wm. Kaemmerer.
1902-03	Geo. M. Beringer.	*Wm. H. Burke.*
1903-04	*Wm. H. Burke.*	E. A. Ruddiman.
1904-05	Chas. A. Rapelye.	Wm. C. Kirchgessner.
1905-06	Wm. C. Alpers.	H. A. Brown Dunning.
1906-07	H. A. Brown Dunning.	Joseph Weinstein.
1907 08	Franklin M. Apple.	" "
1908-09	Leonard A. Seltzer.	E. Fullerton Cook.
1909-10	Otto Raubenheimer.	Erich H. Ladish.
1910-11	Louis Saalbach.	P. Henry Utech.
1911-12	P. Henry Utech.	J. Leon Lascoff.

SECTION ON HISTORICAL PHARMACY.

	Chairman.	*Secretary.*
1904-05	*Albert E. Ebert.*	Caswell A. Mayo.
1905-06	John F. Hancock.	*C. S. N. Hallberg.*
1906-07	*Ewen McIntyre.*	Eugene G. Eberle.
1907-08	Edward V. Howell.	" "
1908-09	John B. Bond.	" "
1909-10	Eugene G. Eberle.	John A. Dunn.
1910-11	Jos. L. Lemberger.	Otto Raubenheimer.
1911-12	Otto Raubenheimer.	Caswell A. Mayo.

OFFICERS OF THE COUNCIL SINCE ITS FIRST ORGANIZATION.

	Chairman.	*Vice-Chairman.*	*Secretary.*
1880–81	Jos. P. Remington.	*Joseph Roberts.*	*Geo. W. Kennedy.*
1881–82	" "	*Wm. J. M. Gordon.*	" "
1882–83	" "	" "	" "
1883–84	" "	C. Lewis Diehl.	" "
1884–85	" "	*John A. Dadd.*	" "
1885–86	" "	C. Lewis Diehl.	" "
1886–87	*Wm. S. Thompson.*	*H. J. Menninger.*	" "
1887–88	Wm. H. Rogers.	Karl Simmon.	" "
1888–89	Jas. M. Good.	*Emlen Painter.*	" "
1889–90	" "	*Wm. S. Thompson.*	" "
1890–91	" "	" "	" "
1891–92	" "	" "	" "
1892–93	" "	*H. M. Whitney.*	" "
1893–94	" "	" "	" "
1894–95	*Wm. S. Thompson.*	" "	" "
1895–96	" "	Wm. C. Alpers.	" "
1896–97	" "	Jas. M. Good.	" "
1897–98	" "	" "	" "
1898–99	" "	" "	" "
1899–00	" "	" "	" "
1900–01	" "	" "	" "
1901–02	*A. B. Prescott.*	*Chas. F. Dohme.*	" "
1902–03	James H. Beal.	Lewis C. Hopp.	Henry M. Whelpley.
1903–04	" "	*Leo Eliel.*	" "
1904–05	" "	Jos. L. Lemberger.	" "
1905–06	" "	Wm. C. Alpers.	" "
1906–07	" "	Albert M. Roehrig.	" "
1907–08	" "	" "	" "
1908–09	Jos. P. Remington.	*Wm. M. Searby.*	Jos. W. England.
1909–10	Fabius C. Godbold.	Julius A. Koch.	" "
1910–11	James H. Beal.	Henry H. Rusby.	" "
1911–12	Eugene G. Eberle.	James M. Good.	" "

THE FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are five permanent Funds at the present time (July 1, 1910), three of which are invested in Massachusetts State bonds, in the name of the Treasurer of the American Pharmaceutical Association.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II, Section 7 (afterwards Section 8), containing the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and this, with a few slight amendments adopted in 1896 and 1900, is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the interest of which for any current year only may be used by the Association for its expenses.*"

Chapter VI, Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

This article was amended in 1888 and 1896 and again in 1906 and changed to Article IV, Chapter VIII. As now in force, it reads as follows:

"Any member of the Association who shall pay to the Treasurer the sum of $100.00 during the first year of his connection therewith, and also any member not in arrears, who after ten years shall pay the sum of $75.00, or after fifteen years the sum of $50.00, or after twenty years the sum of $40.00, or after twenty-five years the sum of $25.00, and any member who may have paid annual dues for thirty-seven consecutive years, shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modi-

fied (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52), again in 1896 (Proceedings, page 17), and again in 1906 (Proceedings, page 100), so as to apply to those who have been members for over twenty years (see Chapter VIII, Article IV, of the By-Laws). Under this clause the life membership (new style) of the present roll is ninety-eight, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884 (p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147) it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471) the Association ordered again a transfer to the same fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the registered securities in which the Life Membership Fund is invested. By vote of the Association, the name of this fund was changed to the William Procter, Jr. Fund on September 15, 1902 (see Proceedings 1902, p. 214), but was changed back to its original name, Life Membership Fund, on September 5, 1906 (see Proceedings 1906. p. 100). The report of the Treasurer on the special funds of the Association, contained in the addendum to his annual report, shows that on July 1, 1911, the value of the Life Membership Fund was $17,964.68 (face value of securities only given), *of which sum the interest for any current year only may be used by the Association for its expenses.*

THE EBERT PRIZE FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determining merit, for the preparation of chemical or pharmacal products; the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, p. 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize.*

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; for 1891, to John U. Lloyd; for 1897, to Albert B. Prescott and Jas. W. T. Knox; for 1898, to Virgil Coblentz; for 1899, to Henry Kraemer; for 1900, to Edward Kremers and Oswald Schreiner; for 1902, to J. O. Schlotterbeck and H. C. Watkins; for 1903, to Fred. B.

Power; for 1905, to Dr. Ernst Schmidt, of Germany; for 1906, to J. O. Schlotterbeck and H. C. Watkins; for 1907, to Fred. B. Power and Frank Tutin; for 1908, to A. B. Stevens and L. E. Warren; for 1909, to Henry Kraemer; and for 1910, to Harry M. Gordin.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1911, its reported value was $964.56 (face value of securities only given). The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

In accordance with the recommendation of the committee on invested savings and trust funds, submitted and adopted at the fifty-eighth annual meeting, see Proceedings, 1910, p. 454, the name of the Ebert Fund was changed to Ebert Prize Fund, and the amount of the prize limited to $25.00 until the excess of interest above the sum annually awarded and added to the principal shall amount to $1,000.00, after which the entire annual interest upon the same shall constitute the Ebert Prize.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526–528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings, 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII (Proceedings, 1881, pp. 190, 549). Members have not availed themselves of this fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Robt. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings, 1889, page 16); and $32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892; $50 to the same investigator in 1893, and $50 again to the same investigator in 1894. In 1896 the sum of $22.33 was paid to the Committee on Indicators for material used in their investigations.

The original sum of $1107.81 ($525 + $582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the fund is invested are specified in the reports of the Chairman of the Council; the reported value was $2501.20 (face value of securities only given) on July 1, 1911. *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

THE ENDOWMENT FUND.

At the fifty-fourth annual meeting, held at Indianapolis, Ind., September, 1906, Messrs. Samuel A. D. Sheppard and James H. Beal proposed the establishment of a permanent fund to be known as the "Endowment Fund" (see Proc. 1906, p. 99), under the following conditions:

"That the said S. A. D. Sheppard and J. H. Beal jointly agree to pay into said fund one dollar for each twenty dollars contributed and paid into said fund by all other members of this Association up to and until such Endowment Fund shall, with its accumulations of interest, reach the sum of twenty-five thousand dollars ($25,000).

"That as moneys shall be received as additions to said fund the same shall be invested in such securities as the Council may direct until the interest and other accumulations, together with the amount of the principal, shall reach the sum of twenty-five thousand dollars ($25,000).

"That when the Endowment Fund shall have reached the sum of twenty-five thousand dollars ($25,000) one-half the income derived therefrom may be used for any purpose deemed wise by the Association.

"That when said Endowment Fund, inclusive of donations, interest and other accumulations, shall amount to the sum of fifty thousand dollars ($50,000), the Association may use ninety per cent. of the income therefrom for any purpose deemed wise by the Association.

"That under no circumstances whatever shall all the income from said fund be used, but at least ten per cent. thereof shall be annually added to the principal of the Endowment Fund.

"That under no circumstances whatever shall the principal or any part thereof be used for any purpose except investment for income, nor pledged for any debt of obligation of the Association, or any person, nor used for any other purpose or in any other manner than as specified."

Contributions to the Endowment Fund have been made at different times, and the names of the contributors published in the annual volume of Proceedings (see Proc. 1907, pp. 47 and 48; Proc. 1908, pp. 476 and 477; Proc. 1909, p. 464; Proc. 1910, p. 478); according to the Treasurer's report, the total amount contributed up to July 1, 1911, was $5,269.46.

THE GENERAL FUND.

On February 26, 1909, the Council directed that $5,000.00 of the current funds of the Association be invested by the Treasurer in some interest-bearing security, to be approved by the Finance Committee and the Chairman of the Council (see Proc. 1909, p. 449). In accordance with this order the Treasurer reported on May 26, 1909, having purchased five $1,000.00 St. Louis, Mo., 4 per cent. bonds at 103⅝ and accrued interest. Again on November 15, 1909, the treasurer, in accordance with an order of the Council (see motion No. 11, page 449), invested $5000.00 of the current funds of the Association in St. Louis city public buildings and public works 4 per cent. gold bonds. All of these bonds are registered in the name of the treasurer of the A. Ph. A. and are kept in the Association's safe-deposit box.

THE WM. PROCTER, JR., MONUMENT FUND.

At the fifty-second annual meeting held at Kansas City, Mo., September, 1904, it was resolved to solicit subscriptions for a memorial monument to be erected in the Smithsonian Grounds at Washington, D. C., to the memory of William Procter, Jr., if possible in 1817, the centennial anniversary of his birth. A committee was appointed to take the matter in charge, which since that time has been active in soliciting subscriptions. The names of contributors have been published from time to time in the annual volume of Proceedings (see Proc. 1906, p. 63; Proc. 1907, p. 98).

In September, 1907, at the annual meeting held in New York City, the Association directed that all moneys collected for the Wm. Procter, Jr., Monument Fund, be turned over to the Treasurer of the A. Ph. A., to be deposited on interest for the benefit of said fund (see Proc. 1907, p. 99). The Treasurer of the A. Ph. A., in his annual report for

1908-1909, reports having received on January 27, 1909, the sum of $3,413.33 from the Treasurer of the Committee, Benj. T. Fairchild, which was placed on time deposit in the International Bank of St. Louis, Mo., for a period of twelve months at 4 per cent. per annum (see Proc. 1909, p. 472). The total sum to the credit of this fund, including interest on time deposits, according to the treasurer's report on July 1, 1911, amounted to $4,478.91.

THE COLLEGE PRIZE FUND.

The Association holds this fund in trust for the National College of Pharmacy, Department of Pharmacy of George Washington University, at the request of Murray Galt Motter (see Proc. 1907, p. 54). The Treasurer, in his annual report for 1909–1910 states that no draft has been made against this account since it was opened August 4, 1905. The amount of the fund, including interest, is $31.00.

THE EBERT LEGACY FUND.

The late Albert E. Ebert having by his will designated the A. Ph. A. as residuary legatee of his estate, it was ordered at the fifty-eighth annual meeting, on recommendation of the committee on invested, savings and trust funds, that the money received from the estate be converted into a fund to be known as the Ebert Legacy Fund, and that this fund be invested in municipal or other public bonds approved by the committee on invested, savings and trust funds and the finance committee, and that this fund be kept intact and the income added thereto until the fund and its accumulations shall together amount to a total of $10,000.00.

When this sum has been reached, the income derived from the fund shall be devoted to such purposes as will, in the opinion of the Council, best commemorate the founder of the fund and his services to pharmacy.

The reason for the suggestion that the old Ebert Fund and the Ebert Legacy Fund be kept separate was, that the first was given by Mr. Ebert for a specific purpose, while the latter was given to the Association practically without restriction and with the evident intention that the Association should use it in the manner which it deemed best.

On December 14, 1909, the executors of the Ebert estate paid over to the treasurer of the A. Ph. A. the sum of $2800.00, which has been deposited in bank at interest. The treasurer's report states that on July 1, 1911, this fund amounted to $2,922.47.

REPORT

ON THE

PROGRESS OF PHARMACY

From July 1, 1910 to December 31, 1911.

By C. LEWIS DIEHL.

INTRODUCTORY

WHEN at the organization meeting in 1852, the Association requested the Executive Committee to secure statistical information concerning

"(1) The number of Apothecaries and Druggists in each of the principal cities and towns of the United States;

"(2) The character and number of Organizations existing in the United States;

"(3) In how far the business of dispensing medicines is separated from the office of prescribing; and

"(4) In how far any information gained in regard to the practice of our art, and the professional character of its practitioners, in different localities, is likely to be of advantage to the Association in promoting its objects"—

the Association took the initial step, which culminated in the course of a few years in the "*Reports on the Progress of Pharmacy*" as they have since appeared in our Annual Proceedings.

At the Second Annual Meeting (1853), the Executive Committee reported the statistical information received on the queries above mentioned, coupled with the recommendation that a "Special Committee on the Collection and Arrangement of the Statistics of Pharmacy in the United States" be appointed, and under this cumbersome title a committee, consisting of five members, with Mr. C. B. Guthrie as chairman, served annually until 1855. At this meeting the subject of Statistics in Pharmacy was referred to the Corresponding Secretary, Wm. Procter, Jr. who made a brief report in 1856, in anticipation of the appointment of a *Standing*

Committee on the Progress of Pharmacy, which had been provided for by an amendment to the Constitution, to undertake the duties heretofore imposed on the Special Committee on Statistics—the new committee consisting of Wm. Procter, Jr. (Chairman), Eugene Dupuy, and James Cooke.

The Committee on the Progress of Pharmacy existed until 1873, and during this period reports were made annually, except during 1861, when no meeting was held; but during this period it became from year to year more difficult to secure a chairman willing to undertake the arduous task of preparing a report, which, as with the progress made in other branches of human endeavor, had made demands on the time of the individual preparing it that could not be asked without proper compensation. It has thus happened that the person selected as chairman of the committee who was to report in 1872, failed to do so, although a fragmentary report was received from one of the members of the committee which appears in the "Proceedings" of 1873. Then, also, the chairman of the Committee, elected (in his absence) to make the report in 1873, was compelled to decline on account of a serious eye affection; whereupon, at the solicitation of other members of the committee, the present Reporter on the Progress of Pharmacy consented to prepare a volunteer report for that year. The following is an exhibit, in chronological order, of the

REPORTS ON THE PROGRESS OF PHARMACY

made from 1857 to 1873, inclusive, with the names of the authors, and the page numbers in the "Proceedings,"

Proceedings 1857, pp.	50–79	Wm. Procter, Jr.
" 1858, "	49–100	Frederick Stearns.
" 1859, "	49–114	Wm. Procter, Jr.
" 1860, "	65–129	Edward Parrish.
" 1862, "	49–191	John M. Maisch.
" 1863, "	49–172	Ferdinand F. Mayer.
" 1864, "	56–182	George J. Scattergood.
" 1865, "	97–143	J. Faris Moore.
" 1866, "	139–197	Enno Sander.
" 1867, "	123–267	C. Lewis Diehl.
" 1868, "	129–286	C. Lewis Diehl.
" 1869, "	123–283	Frederick Hoffman.
" 1870, "	202–298	F. Mahla.
" 1871, "	129–330	Wm. T. Wenzell.
" 1872, "	125–151	Jas. B. Mercein.
" 1873, "	151–420	C. Lewis Diehl.

For reasons stated it became desirable to create the office of Reporter on the Progress of Pharmacy, and this having been provided for by proper amendments to the Constitution of the Association, the present

incumbent was elected to that office, which he has filled uninterruptedly to the present date, with an interval of four years (1892–1895 inclusive), occasioned by impaired health; Dr. Charles Rice consenting to assume the duties of the office during 1891–1892, while Professor Henry Kraemer was elected and made the reports for the years 1893–1895 inclusive.

With the publication of the "Proceedings" of 1910 a second period in the history of Reports on the Progress of Pharmacy, covering thirty seven years, may be regarded as closed. During the many years of this and the preceding period, the work of abstracting the Journals and preparing the manuscript for the printer has been done, practically, without assistance; and, with the primary consideration to give the rank and file of the pharmaceutical profession actually engaged in business a clear review of the more important papers that have been published in the world's periodical literature on subjects related to the professional as well as the practical side of their calling, the accumulated facts were presented in a form in which they might be utilized without the necessity of referring to the original when practicable, or, when not, with sufficient explanation to justify looking up the original. For the brief reference to some newly discovered fact or observation, while in most cases sufficient to the professional man, the teacher, or the chemist, who has access to a well-appointed library, is useless to the average pharmacist who probably has convenient access only to one or two journals, and whose interest may be awakened only by a more detailed description.

Losing sight of the main purpose of the Report on the Progress of Pharmacy, to present a comprehensive and orderly review of the advances made in matters related to the practice of pharmacy during certain specified periods, that would prove of the greatest value as a work of reference for future consultation or research work, it has frequently been urged that there is too great a delay in the publication of the report, and that the information contained therein has in a certain sense become obsolete before it reaches the eye of the member through the medium of this report. It would be futile to argue with those who hold this view and do not consider its more important value as a work of reference; but it must be conceded that it is desirable to shorten the interval between the period covered by the report and the accessibility of its contents to the members of the Association. This has hitherto been impracticable for two reasons: firstly, because the labor of making the report devolved upon a single individual; and, secondly, because its prompt publication depended on the regularity with which the minutes and other matters for publication were available to the editor of the "Proceedings."

It is now confidently hoped that these untoward conditions will be remedied by the decision of the Association to publish a monthly "Journal," in lieu of the annual volume of "Proceedings," in which such interresting abstracts for the report as are available will be published in

advance of the Report on the Progress of Pharmacy. This report is hereafter to be a separate publication, and by giving the Reporter the assistance of a number of collaborators, of his own selection, the work of making the abstracts will be divided, and the delay in publication materially shortened. Under the new arrangement, also, the period to be covered by the report for the present year (1911) is to be extended so as to include the six months from June 30 to December 31, making a total of eighteen months, and hereafter the reports are to cover the calendar year, from January 1 to December 31 inclusive. The increased work imposed by extending the period of the report for 1911 to December 31, has necessarily caused some delay in the publication of the present report, this delay being augmented by illness during part of the past winter, not to speak of other duties assumed in Association work; but it may be confidently expected that the manuscript for future reports will be ready for the printer within sixty days after the appearance of the last journal to be abstracted.

The arrangement in the report herewith submitted is the same as that adhered to in previous reports, with the exception that no cognizance is taken in the Proceedings of State Pharmaceutical Associations, nor of the Proceedings of the Local Branches of the A. Ph. A., other than to abstract such papers as became available. The record of the Branches is complete in the Journal of the Association, while the Proceedings of the State Associations that have reached the Reporter's hands are so few (less than for the years 1910 and 1911) that the object of giving information regarding their proceedings in this report is entirely futile. In all other respects, it is believed that the present report fairly reflects the more important articles which appeared in the journals at home and abroad.

PHARMACY.

A—General Subjects.

A Symposium of the Pharmacopœias of the World was a notable feature in the Section on Practical Pharmacy and Dispensing, the subject being introduced by the chairman of the Section, Mr. Raubenheimer, and followed by individual reviews of the different Pharmacopœias by individual members, which appear in the "Proceedings," 1910, 1135–1226. These are as follows:

International Standards in compliance with the Protocol of the Brussels Conference, by M. I. Wilbert (p. 1139–1140).

Pharmacopœia Belgica III, by Murray Galt Motter (p. 1140–1151).

Pharmacopée Française (Codex Medicamentarius), by H. A. B. Dunning (p. 1151–1157).

Pharmacopœia Germanica; by E. C. Goetting (p. 1157–1160).

British Pharmacopœia (A comparison with the U. S. P.), by E. H. Gane (p. 1160–1167).

Hungarian Pharmacopœia, by A. R. L. Dohme and Hermann Engelhardt (p. 1167–1195).

Japanese Pharmacopœia, by Dr. J. Takamine (p. 1195–1201).

Netherlands Pharmacopœia, by Henry Kraemer (p. 1201–1211).

Spanish Pharmacopœia, by Hugh Craig (p. 1211–1218).

Pharmacopœias of Spanish America, including Chili, Argentina, Venezuela, Mexico, by M. I. Wilbert (p. 1218–1223).

Pharmacopœia of the United States, by William Alpers (p. 1223–1226).

Cuban Practical Pharmacy and Dispensing is interestingly described by E. Berger in a paper which appears in "Proceedings," 1910, 1132–1134.

Pharmacopœial Preparations, Products and Processes are the subject of a large number of laboratory notes contributed by John R. Ripperton in a paper which appears in "Proceedings," 1910, 1058–1065.

U. S. P. and N. F. Preparations.—Criticisms and suggestions for improvements are given in the "Proceedings," 1910, of the following preparations, by several writers, as noted:

Liquor Magnesii Citratis,
Syrupus Ferri Iodidi, by John K. Thum (pp. 1260–1262).
Essence of Pepsin, N. F.,
Mistura Glycyrrhizæ Comp., U. S. P.,
Elixir Iron, Quinine and Strychnine Phosphates, U. S. P.,
Compound Licorice Powder,
Valeric Acid Salts, by Chas. H. Ware (pp. 1267–1269).
Syr. Hypophos. Co., U. S. P.,
Elixir Aromaticum,
Tincture of Iodine,
Compound Tincture of Green Soap,
Calx Iodinata,
Compound Mixture of Glycyrrhiza,
Ointment of Phenol,
Granulated Sugar,
Soft Soap, by I. D. A. Hartz and Thos. D. McElhenie (pp. 1269–1271).
Elixir Digestivum Compositum,
Spiritus Menthæ Piperitæ,
Tinctura Iodi,

Elixir Pepsini,
Unguentum Phenolis,
Emulsum Olei Morrhuæ,
Elixir Ferri, Quininæ et Strychninæ Phosphatum,
Misturæ Contra Diarrhœam, by Abraham Weinstein (pp. 1279–1281).

Nomenclature of the U. S. P. is the title of a paper by C. S. N. Hallberg, in which he discusses the evolution of names in the pharmacopœias since the appearance of the first American Pharmacopœia—the U. S. P. of 1820, from which it appears that the only changes in nomenclature are found in the chemical and botanical parts. The paper and discussion thereon appear in "Proceedings," 1910, 762–767.

Latin Titles (so called) found in the Pharmacopœias is the subject of a paper by Oscar Oldberg, in "Proceedings," 1910, 756–762.

Synonyms is the subject briefly introduced by Joseph P. Remington for the purpose of discussion by the members of the question, advocated in the previous revision, to discourage their use by omitting them as far as possible from the U. S. P., which appears in "Proceedings," 1910, 616–620.

Drug Names—Etymological Derivation.—Among many derivations of the names of drugs given in Tschirch's "Handbuch der Pharmacognosie," the following are of sufficient interest to justify their reproduction here: *Mastic* comes from μαστιχάειν, to chew, from the use to which the resin was applied. *Coriander*, from χόρις, a bug, from the buglike odor of the green fruits. *Opium* is derived from ὀπός, juice of juices. *Rosmarinus*, from ῥώψ, a low shrub, and μύρινος, balsamic. *Aconitum*, according to Pliny, is so called from the port Acone. *Elemi*, formerly *Elempi* and *Elemnia*, is attributed by some to ἐλαιος, as it was formerly thought to be the exudation of an African oil tree; another derivation may be the Semitic *luban; ab luban*, in Arabic, being incense. *Fagopyrum* is a hybrid Græco-Latin word from *fagus*, beech and πυρος, wheat. *Galbanum* is from the Hebrew *chelbenach; Gum* is from an Egyptian word, *kani*, traced back to the seventeenth century B. C. *Orange* is attributed to the Sanskrit *nagaranga* or *naranga*. *Rob* or *roob* to the Arabic *rubûb*, thick juice. *Looch* is from another Arabic word, *laûqat*, pleasant juice; *syrup* from the same language, *scharab*, beverage. Ether is derived from the Persian or Arabic *attar*, or *itr*, an agreeable perfume. *Caryophyllus* possibly comes from the Sanskrit *katukaphala*. *Guttapercha* is a corruption of the Malayan *gitah*, milky juice, and *pertcha*, coming from Sumatra. The names of the different varieties of Chinese teas are given as: *Feko*, from *Pak-ho*, white down, from the hairs on the flower-bud; *Congou* from *Koong-Fa*, trouble; that is, troublesome to prepare; *Souchong*, from *Seau-Chong*, small kind. *Oolong*, black dragon. *Arrowroot* is a corruption of the Indian *araruta; ara*, flour, *ruta*, root. *Gentiana* is derived from the King Gentius who

died 167 B. C. *Rottlera* derives its name from Rottler, a missionary of Madras; many other proper names have also been thus used. Tribe names are also thus used, as in *Senega*, from the Senecas, a tribe of North American Indians, and *Agaric* from a tribe of Sarmates, the Agaroi, dwelling near the Sea of Azoff. *Veronica* has nothing to do with the saint of that name, but is derived from *Vetonica* or *Betonica*, as the plant was common in Lusitania, where the tribe of Vettons dwelt. Geographical names are generally self-explanatory, thus *Levisticum*, or *Ligusticum*, indicate origin in Liguria. *Cydonia* from the town Κυδόνεια, in Crete; and *Colophonium* from the town Kolophon of Ephesus.—Pharm. Journ. and Pharmacist, Aug. 6, 1910, 215; from Journ. de Pharm. et Chim. (Appendix), 1910, *2*, II.

Galenicals of the U. S. P.—Short-Cut Methods of Preparation.—F. J. Blumenschein deprecates the use of the "Fluids," "Fluidextracts," and "Solubles," exploited by manufacturers for the extemporaneous methods of preparing U. S. P. and N. F. galenicals, and points out in a number of examples the fallacy of such a course which is in most cases based upon misrepresentations on the labels of their exploiters.—Proceedings Pa. Pharm. Assoc., 1910; Amer. Drugg., Sept. 12, 1910, 129, 130.

Construction of Formulas is a subject brought up for discussion by H. P. Hynson with the object of drawing attention to the want of uniformity in the text of the National Formulary, citing a number of glaring instances, which appear, with the discussion, in "Proceedings," 1910, 684–688.

Doses in the U. S. P. is the subject of a paper by Clement B. Lowe in which he expresses the opinion that it would have been of greater value to have given minimum and maximum doses and also the maximum dose for twenty-four hours, as is done in a number of European pharmacopœias, than to state, as at present, a definite (average) dose. This paper appears in the "Proceedings," 1910, 671–673.

A Federal Poison Law, its need in view of the existence of 53 separate and distinct law-making jurisdictions within the United States, and the annoyance engendered by material differences in those laws that have or may be enacted, is the subject of a paper by Lyman F. Kebler, which appears with the discussion in "Proceedings," 1910, 620–623.

B.—APPARATUS AND MANIPULATION.

Apparatus and Utensils of the G. P. V—Official Requirement and Description.—In consequence of the increased requirement of analytical operations in connection with the tests of purity and identity of the new German Pharmacopœia, the number of apparatus and utensils which must be available in the pharmacies of the German empire, has been considerably increased. Among these may be mentioned the following:

A Normal Dropper, in accordance with the Brussels specification.

A Lime Drying-Chest of efficient construction.

An Analytical Balance of specified accuracy.

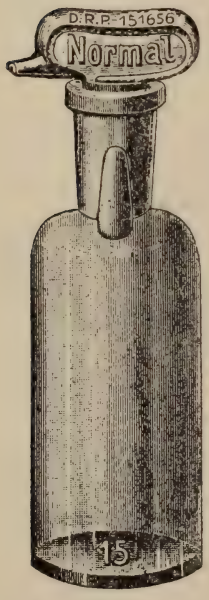
A Microscope of specified power.

A Melting-point Apparatus of specified construction.

The "Pharmaceutische Zeitung" briefly reviews the pharmacopœial requirements, accompanied by illustrations, only a few of which need reproduction in the present abstract, as follows:

The Normal Dropper.—There are two forms only at present on the market that conform to the agreement of the Brussels Conference, in that 20 drops of distilled water delivered from them at a temperature of 15° weigh 1 gram. One of these is the pipette dropper described by Eschbaum, illustrated and described in the "Proceedings" 1904, 478 (Fig. 2). This has the advantage of economy and convenience, since very small quantities of a liquid can be withdrawn from the ordinary containers and returned to them without loss. The second normal dropper, here shown by Fig. 1, consists of a small vial with a stopper and neck grooved so as to form an aperture that accurately delivers the standard number of drops. This form, which is known as the "Viginta Drop Glass," has the advantage over the Eschbaum dropper that it combines container of the medicament with the dropper, and thus assures accurate dosage when delivered to the patient.

FIG. 1.



Normal Dropper.

The Analytical Balance is characterized by the requirement: "A balance for the determination of specific gravities and for delicate weighing which permits the accurate recognition of 0.001 Gm. with a load of 100 Gm." A number of balances are shown in illustration, including several intended particularly for specific gravity weighings, but need not be reproduced here.

The Microscope required is simply described as one having a power of at least 350 diameters, and must be provided with an ocular micrometer. The latter, which does not always accompany good microscopes, can easily be supplied supplementary.

The Apparatus for Determining Melting Points is described as follows: "The capillary tube, filled with the substance under examination, is attached to a suitable thermometer in such a way, that the substance is on a level with the mercury bulb of the thermometer. This is then inserted into a test tube, having a diameter of about 15 Mm. and 30 Cm. long, containing a layer of sulphuric acid about 5 Cm. high. The upper,

open end of the capillary tube must extend above the sulphuric acid layer. The test tube is now placed in a long-necked globular flask, the neck about 3 Cm. diameter and 20 Cm. long, the body having a capacity

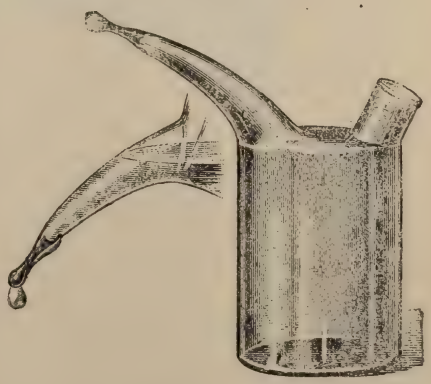
FIG. 2.

FIG. 3.

The Apparatus for Determining Melting Points.

of 80 to 100 Cc. and containing sufficient sulphuric acid to fill the flask after the test tube has been introduced to about two-thirds the height of the neck. The arrrangement is shown by Figs. 2 and 3. A similar arrangement is also described in "Proceedings," 1910, p. 52.—Pharm. Ztg., lvi (1911), No. 19, 191–193.

FIG. 4.



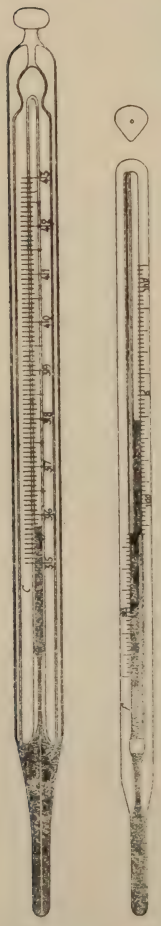
Normal Dropper.

Normal Dropper — A New Form. — Dr. Kunz-Krause has devised and recommends a normal dropper which, it is claimed, delivers drops of uniformly the same size and weight. This dropper is shown by Fig. 4 and is adjusted to deliver drops of such size that 20 drops of water at 15° C. will correspond to 1 gram water so long as the level of water is not much below the middle of the flask—the adjustment being made with the flask half-filled, since it is impossible on physical grounds to construct such a dropper so that it will deliver

drops of uniformly the same size when the flask is full and when it is nearly empty. The dropper is supplied by the firm of Franz Hugershoff, Leipzig.—Pharm. Ztg., lvi (1911), No. 57, 577.

Modern Pharmaceutical Machinery—Marvelous Advances Made.—Daniel M. Grosh speaks interestingly of modern pharmaceutical machinery and mechanical aids. He says the introduction of machinery in the laboratory of the pharmaceutical manufacturer has revolutionized the business, and in order to keep up with the times the manufacturer has called to his aid steam, electricity, compressed air, hydraulics, and the vacuum. The present age of machinery has seen the old, laborious and wasteful processes replaced by the new methods. The advances made have been truly remarkable. In the old days about the only real machinery in the laboratory was the still and condensers, and possibly a few other crude machines. Now almost every process is carried out with the aid of mechanical help. It is marvelous to contemplate how the machines have superseded manual labor, the product of the ingenious inventor overcoming obstacles and keeping pace with the demands of the century's progress. The requirements of the manufacturer as to special machinery have resulted in the establishment of pharmaceutical machine specialists, several firms producing this machinery exclusively. These specialists combine their knowledge of practical and theoretical mechanics with practical pharmacy, and knowing what results are desired, work along the lines to produce those results. The human factor has been eliminated so far as it has been possible to do so at the present day, and there is no doubt that the quality and accuracy of the products have been greatly improved thereby. It is within the experience of the author that all these improvements and advances have been made, and a retrospection emphasizes the fact that the old apothecary, bending over his alembic and retort making his plasters and potions, has disappeared forever, and his place has been taken by the scientist, the specialist and the machine.—Merck's Rep., Dec., 1911, 333, 334.

FIG. 5.



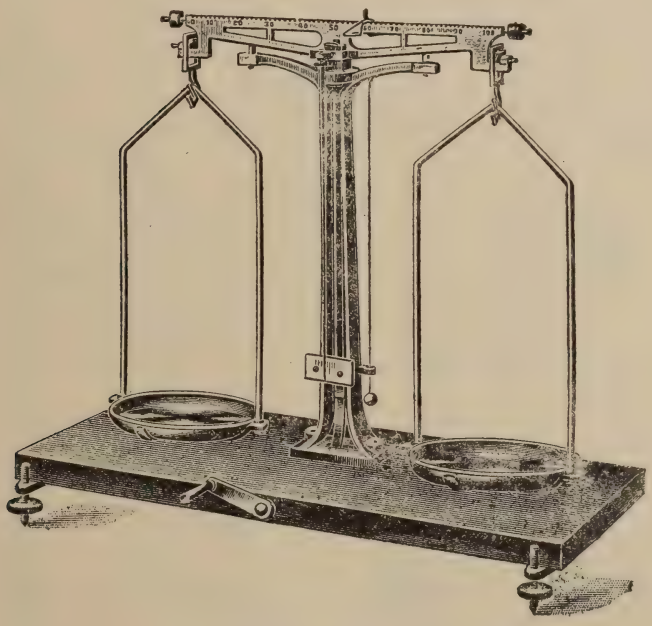
Fever Thermometer.

Clinical Thermometers — Improved Scale.— The firm of C. J. Tagliabue (New York) has introduced a new prismatic fever thermometer, which by the peculiar construction of the prismatic tube, shows at a glance when the temperature has exceeded

the normal (98.6° F. = 37° C.). This is plainly exhibited by the accompanying cut (Fig. 5), and is brought about by grinding a narrow dull strip on the right side of the prism-edge below and up to the point at which the fever temperature, 98.6° F. begins, and similarly grinding a dull surface on a narrow strip on the left side of the prism-edge above that point. The convenience of this improvement is obvious.—Pharm. Ztg., lvi (1911), No. 84, 847.

New Chemical Balance—A Design for Pharmaceutical Analyses.—Professor E. Rupp has designed a new chemical balance, shown by Fig. 6, which is manufactured by Bosch Bros., Jungingen, and is specially intended

FIG. 6.



New Chemical Balance.

for the analytical operations required of pharmacists. The frame, beam and pans are of aluminium, the beam being provided with 100 notches equally divided and a rider weighing 0.05 Gm.—each division representing 0.001 Gm., so that adjustments may be made from 1 to 100 Mgm. by advancing the rider from O (the equilibrium) on the left towards 100 on the right. The balance functions accurately and permits the satisfactory weighings required in pharmacopœial methods of examination.—Pharm. Ztg., lv (1910), No. 93, 936.

Sterilizable Hand-balance—A Practical Convenience.—A convenient hand- or rider-balance which is sterilizable is shown by (Fig. 7). It

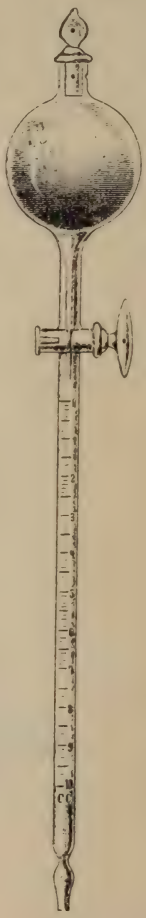
differs from these balances as ordinarily constructed in that the pans, constructed of *pure* nickel, are suspended by means of fine chains of the same metal and that one of the pans is provided with a lip from which the substance weighed may be introduced directly into the vessel in which it is to be dispensed. The sterilization of the pans is effected by passing them with the adjacent portion of the chain three times through the flame. These balances, with the nickel-spoon of special form (shown in the cut) are supplied by Geo. Wenderot, Kassel.—Pharm. Ztg., lvi (1911), No. 22, 218.

Reservoir-Burette—New Form.—Dr. Wulff has constructed a new form of reservoir-burette which appears to be particularly adapted for the measurement of sterilized fluids. As shown by (Fig. 8) it consists of a graduated burette joined to a capacious reservoir, the mouth of which is closed with a hollow ground-glass stopper.

FIG. 7.

Sterilizable Hand-balance.

FIG. 8.

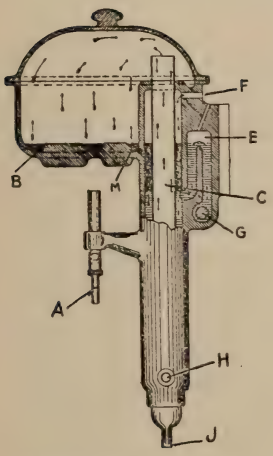


Reservoir-Burette.

This stopper and the wall of the neck are each provided with a hole through which by a proper turn air is admitted into the reservoir. The burette and reservoir communicate with each other by means of a glass cock, which is provided with a number of borings so placed that by a turn of the cock the inflow of liquid from the reservoir and the outflow from the burette may be accomplished. The apparatus is supplied in two sizes by the firm Fridolin Greiner, Neuhaus, the smaller size being intended particularly for the measurement of very small quantities of sterilized fluids. —Pharm. Ztg., lvi (1911), No. 4, 36.

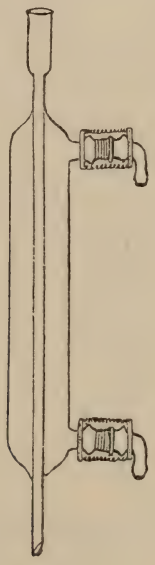
Automatic Water Still—An Inexpensive and Convenient Apparatus.—F. J. Stokes gives the following description of the automatic water still shown by Fig. 9, which he recommends as being inexpensive and efficient. The feed water enters at (*H*) in the diagram, surrounding the condenser tube (*C*) and serves first to condense the steam generated in the still (*B*). As the steam descends the condenser tube it becomes heated to the boiling point by the time it reaches the top, where the ammonia and other gases escape into the air through the passage (*F*). A part of the feed water flows over the goose neck (*E*) into the sink and the balance passes into the still through the passage (*M*). The still is heated by a Bunsen burner. The distilled water comes out at (*J*) and can be piped to any

FIG. 9.



Automatic Water Still.

FIG. 10.



Condenser.

receptacle. The condenser tube extends to the extreme top of the steam chamber and high above the water level, so there is no danger of water being carried over by the steam.—Amer. Journ. Pharm., March, 1911, 115, 116.

Condenser—Rotatory Tube Attachments.—In distillation experiments with the use of the Liebig or similar form of condenser it is not infrequently desirable to change the position of the condenser, resulting in the twisting and other disarrangements of the rubber connections with the water supply. The firm of Hodes & Göbel (Ilmenau) have now devised a rotatory tube attachment, which permits the adjustment of the condenser in any desirable position without in any way interfering with the inflow or

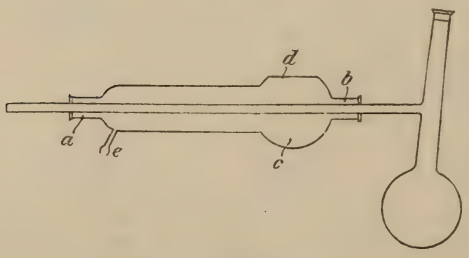
exit of the cooling water. This attachment is shown by the accompanying cut (Fig. 10), which is self-explanatory. The rubber supply tubes are securely held in place by means of spring clamps, which also permit their easy removal if such becomes desirable.—Pharm. Ztg., lvi (1911), No. 22, 219.

Convenient Cooler—A Design for Small Distillations.—Dr. A. Hahn has found the cooler shown by Fig. 11 to be very convenient and serviceable for small distilling operations. It slips over the long lateral neck of the usual form of distilling flask, being held in position by sections of rubber tubing at *a* and *b*, the extremity *c* nearest to the neck of the flask being expanded bulb-shaped in order to admit of a wide opening, *d*, for the renewal of water from time to time (or by constant inflow), which runs off at *e*.—Pharm. Ztg., lv (1910), No. 68, 686.

Pressure Percolation.—Experimental work is described with an illustration by Hiland Flowers in a paper which appears in "Proceedings," 1910, 1252–1256.

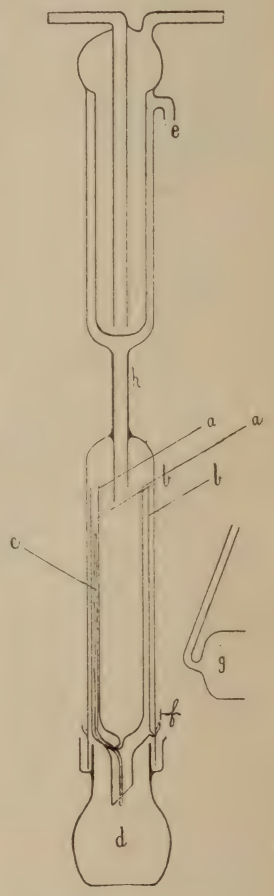
Extraction Apparatus—Improved Construction.—To remedy certain objections to the prevailing form of the Soxhlet extraction apparatus, G. S. Walpole has designed and recommends the construction exhibited by Fig. 12, and describes the several parts as follows:

FIG. 11.



Convenient Cooler.

FIG. 12.



Extraction Apparatus.

1. A condenser and outer jacket all in one piece. At *f* are two projecting hooks of glass, which can take elastic bands passed round the flask *d*. These assist in holding the two parts together when the apparatus is in use, but were found unnecessary if the clamp and retort-stand holding the outer jacket were properly firm. The best place to clamp is the thick glass tube

h joining the condenser to the outer jacket. At *e* a tube is sealed in, connecting the interior to the external air, which can be fitted with a suitable attachment for drying the air.

2. The flask *d* contains the solvent. Several of these should be supplied. They can be tared if necessary. An additional ring of glass running round the neck holds sufficient mercury to form an air-tight joint—a lip facilitating pouring the mercury out of the annular space.

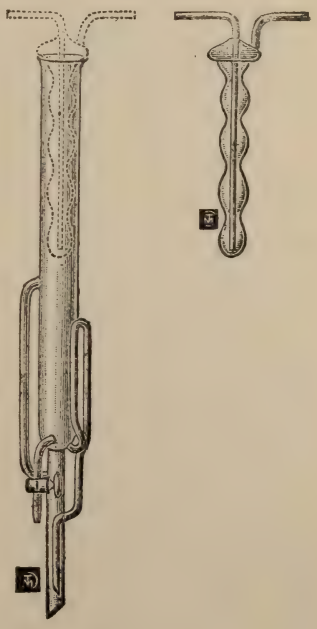
3. A wide tube, labeled *b*, *b*, in the diagram, having three projections near its lower constricted end. These rest on the edge of the neck of the flask. This supports the tube *a*, *a*, which, however, may be dispensed with and replaced by a Soxhlet thimble.

4. The inner tube *a*, *a*, is best made of such dimensions that one of the stock sizes of Schleicher and Schüll's thimbles just fits into it. At its lower end it is brought to a narrow constriction, and a capillary tube, *c*, is affixed and bent to form a syphon, as in the usual form of Soxhlet extractor.

5. The still head *g*, by means of which the solvent may be recovered from the tared flask when the extraction is ended.—Chem. News, Sept. 9, 1910, 129–130.

Soxhlet Apparatus—Improved Condenser.—Oswald Silberrad recommends the improvement of the Soxhlet apparatus by the simple insertion of a bulbous Walters condenser into the open end of the Soxhlet tube, as shown in the accompanying cut (Fig. 13), which must be somewhat lengthened for the purpose. By this arrangement the troublesome and unsatisfactory cork-joint between the top of the extractor and the lower end of the reflux condenser attached thereto, is entirely done away with.—Chem. News, Aug. 4, 1911, 54.

FIG. 13.



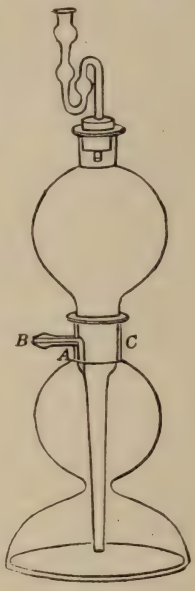
Soxhlet Apparatus.

Gas Generator — Economical and Practical Construction.—Dr. H. Serger has for years used with advantage a self-constructed gas generator, equally adapted for the generation of hydrogen, hydrogen sulphide, carbon dioxide and chlorine, which is shown by Fig. 14. It consists of a 1–1½ liter w. m. bottle, *A*, into the mouth of which a rubber-stopper, *B*, is inserted, bearing an ordinary lamp chimney, *C*, expanded at *F*, from the shoulder downward, and reaching to within 2 Cm. of the bottom of the

bottle ; the upper, narrower portion, extends several centimeters above the rubber stopper, *B*, and is closed by a rubber stopper, *D*, bearing a delivery tube, *E*, which may be closed with a glass cock or, in the absence of this, by a clip on a rubber tube. A perforated porcelain disc, such as is used in filtering operations, is inserted at *F*, on which the material to be acted on by the acid—ferrous sulphide, marble, zinc sticks, or chlorinated lime cubes—is placed. The bottle *A*, having been filled to about two-thirds its capacity with a mixture of hydrochloric acid and water, in equal parts, and the cylinder *C* closed with the

FIG. 14.

FIG. 15.



Gas Generators.

stopper *D* (the glass cock or clip at *E* being also closed) the apparatus is inserted firmly by means of the stopper *B*. Between this stopper and the bottle a small wedge-shaped cut is made for the admission of air. The function of the apparatus requires little explanation. On opening the cock or clip at *E*, the acid is admitted into the cylinder and reaching the material from which the gas is to be generated, becomes at once effective. On closing the cock, the acid is forced back and the cylinder retains the excess of gas generated.—Pharm. Ztg., lvi (1911), No. 80, 806.

Gas Generator—New Construction.—Dr. F. Michel describes a new gas generator, shown by Fig. 15, which he recommends as more convenient than Kipp's apparatus or any of the modifications hitherto described, from which it differs in having the delivery tube (*B*) in the ground-glass neck (*C*) into which the upper globular portion is accurately fitted. It is provided with a small hole (*A*), which when turned so as to be coincident with the delivery tube, establishes communication with the interior. The solid substance is carefully introduced into the central globe through the neck (*C*) after removal of the upper portion. The action is very

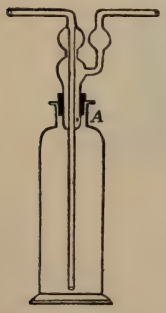
simple and requires little explanation. The openings *B* and *A* being placed in communication, the acid is allowed to flow into the lower portion until this is filled to the neck, so as to expel the air completely; whereupon by a slight turn communication is intercepted and the acid is forced back through the elongated extension into the reservoir by the gas generated. This may then be delivered and renewed at will by bringing the opening *A* into juxtaposition with the delivery tube *B*. The apparatus is manufactured by H. Goeckel, Berlin.—Pharm. Ztg. lvi (1911), No. 15, 150; from Chem. Ztg., 1911, No. 6.

Gas Wash- and Absorption-Bottle—Efficient Construction.—Theo. Grzeschik describes a new form of wash- and gas-absorption-bottle, constructed according to suggestions of H. Adammes and supplied by G. Mueller, Ilmenau, which is shown by Fig. 16. The tall cylindrical vessel is provided with two minutely perforated (sieve-like) plates, a smaller (lower) and a larger (upper), which rest on ledges formed by the special shape of the vessel. This is closed by a well-fitting ground-glass stopper (or cover) bearing a central bent-tube reaching through the sieve-plates to near the bottom of the vessel, and an outlet tube, to carry off the washed gas —the stopper and tubes forming a single piece. The gas entering the liquid near the bottom is forced through the innumerable holes in the sieve-plates, whereby its thorough washing (or complete absorption) is facilitated more efficiently than in the wash- or absorption-bottles commonly in use. Moreover, the several parts of the apparatus are easily cleansed after use.—Pharm. Ztg., lv (1910), No. 78, 790; from Chem. Ztg., 1910, No. 107.

FIG. 16.

Gas Wash-Bottle.

FIG. 17.



Wash-Bottle.

FIG. 18.

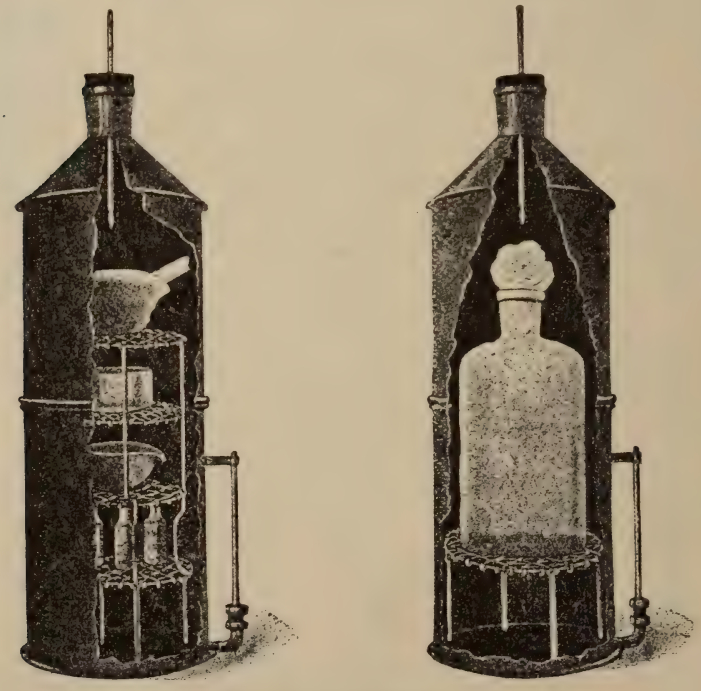
Spritz-Bottle.

Wash Bottles—Convenient Attachment.—Hühne has devised a simple attachment for gas-wash bottles, which conveniently serves for regulating or arresting the inflow of gas without the use of a clip or tap. As shown by Fig. 17, it consists of an air chamber or mantle blown on the inflow tube, provided with a small opening (*A*) near the bottom, which can be opened or closed at pleasure by sliding the tube down or upward through the well-fitting bore of a rubber stopper or paraffined cork

in the neck of the bottle. When open the washed gas passes into the mantle, and from this is conducted to its objective point through lateral bent tube, as shown in the drawing. The same principle is utilized in the *Spritz-Bottle* shown by Fig. 18, in which the conditions are simply reversed, the ejection of the washing liquid being arrested by simply raising the attachment until the opening is covered by the bore of the stopper. These devices are supplied by Heinrich Goeckel & Co., Berlin.—Pharm. Ztg., lvi (1911), No. 15, 150; from Chem. Ztg., 1911, No. 8.

Dialysis—Membranes and Apparatus Suitable for the Purification of Colloids.—R. Zsigmondy and R. Heyer make some interesting observations on the purification of colloids by dialysis. In experiments in which the suitability of different membranes (parchment, collodion, fish-bladder, etc.) for dialysis was tested, it was found that fish-bladder is superior to the other membranes. The progress of the purification of

FIG. 19. FIG. 20.



Sterilization Apparatus.

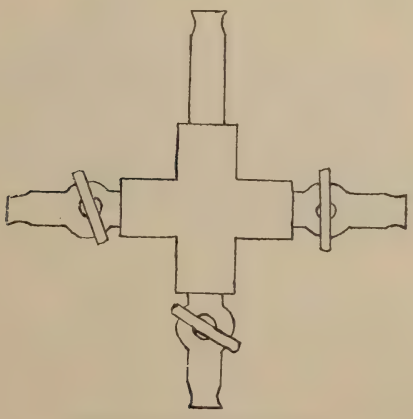
colloidal silicic acid was tested from time to time, and it was found that by dialysis with frequent change of water chlor-ions can be practically removed in a few days. The experiments were repeated in dialyzers in which the water was continually changed, and the same results were obtained. A new dialyzer was constructed in which the large water holder

of the ordinary form was replaced by a cylindrical vessel of large sectional area and small altitude, and the layer of water was rapidly replaced by a current of fresh water. This new form of apparatus enables colloids to be purified by dialysis much more rapidly than in the old form.—Chem. News, Dec. 16, 1910, 305; from Ztschr. f. Anorg. Chem., *68* (1910), No. 3.

Sterilization Apparatus—Practical Forms.—The firm of Bach & Riedel (Berlin) have devised and supply several new and practical forms of sterilizer which are particularly adapted to facilitate modern demands upon the pharmacist, requiring the sterilization of the utensils as well as the containers of medicaments, as shown by Figs. 19 and 20. The upper part of the apparatus is provided with a thermometer indicating temperatures up to 110° C. Sterilization is effected by placing the object on removable shelves of wire netting, supplied in variety to serve the different demands requiring their use. Water is introduced into the sterilizer to the required height estimated and regulated by the aid of the manometer, and heat is then applied until steam rapidly issues from the opening in the top—the thermometer then usually indicating 98°—the heating being continued during 30 minutes.—Pharm. Ztg., lvi (1911), No. 77, 775.

Movable Gas Distributor—A Useful Device.—Philip Blackman has devised the movable gas distributor, illustrated by the accompanying cuts,

FIG. 21.

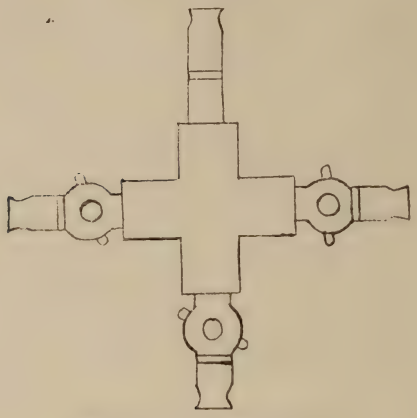


Movable Gas Distributor.

Figs. 21, 22, which has three brass taps and a brass nozzle, and is of great stability. It will not overturn unless purposely made to do so, on account of the comparatively wide spread of the four supporting feet and their shortness, being not more than half an inch in height. These are indicated by the four double lines shown in the under-side view, Fig. 22, while the positions of the three taps are shown in the surface view, Fig. 21.

The nozzle being connected with the gas supply by means of rubber tube,

FIG. 22.

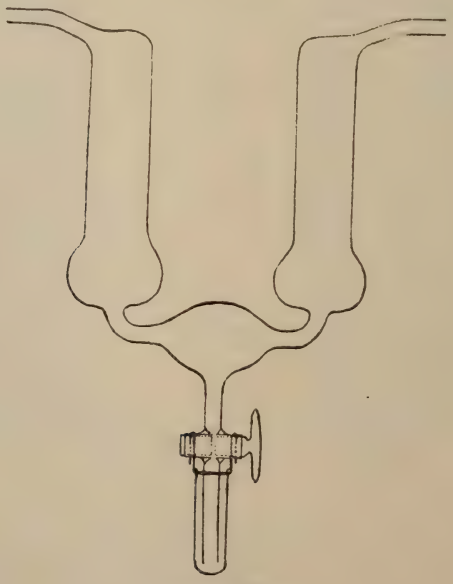


Movable Gas Distributor.

the taps may be connected with three burners in the same way, with obvious utility.—Chem. News, Nov. 24, 1911, 247.

Drying Tube—Modified Form.—Engaged in an investigation requiring

FIG 23.



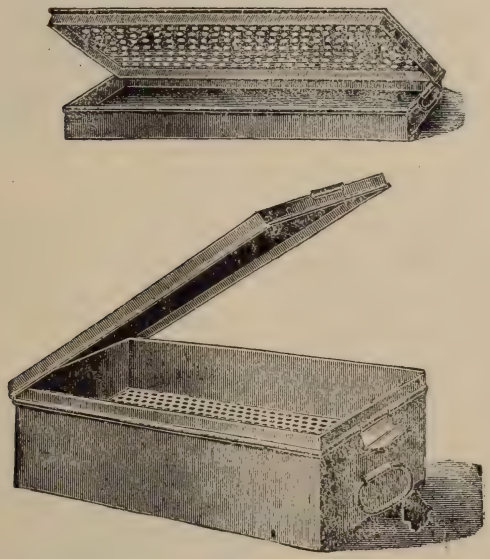
Drying Tube.

the use of a train of Pelligot tubes, charged with H_2SO_4, for drying pur-

poses, which required disconnection every few days to change the H_2SO_4, Edwin Dowzard obviated this inconvenience by fusing a stop-cock to the lower part of the drying tube, as shown by the accompanying cut, Fig. 23, thus permitting the removal and resupply of H_2SO_4 (by suction) without disconnecting the train. A small test tube is suspended under the stop-cock by means of copper wire, to catch any drops of H_2SO_4.—Amer. Journ. Pharm., Nov., 1910, 509.

The Lime Drying-Chest is required by the *G. P. V.* to be available for use of such capacity as to meet the demand likely to be made for drying operations, neither the form nor arrangement being specified. Two forms are here shown, both constructed of tinned iron, Fig. 24 showing one form

FIG. 24.



Lime Drying-Chest.

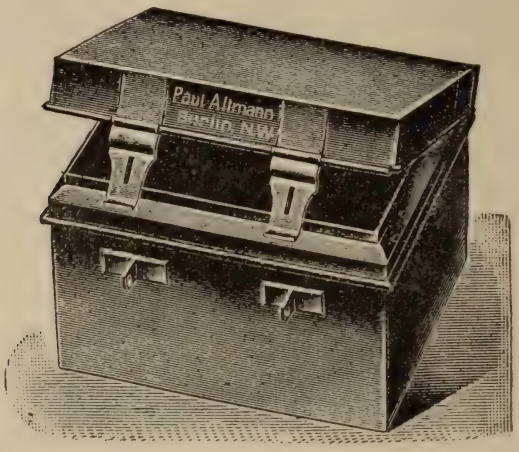
and also that of the tray for the reception of the lime, while Fig. 25 shows another form, which excels in being provided with an absolutely air-tight cover. Both forms are supplied in Berlin.

Lime Drying-Case—Construction of Wood.—Instead of using sheet metal for the construction of the lime drying-case, required by the Pharm. Germ. V, A. Ziel (Coblenz) suggests the practicability of its construction of wood. Such a case, which is supplied in different sizes, is shown by Fig. 26. It has the convenience of a drawer for the reception of the lime, which may thus be renewed from time to time as required.—Pharm. Ztg., lvi (1911), No. 30, 304.

Lime Closet—Convenient Form for Quantities in Drying Herbs.—Karl

constructs a convenient lime drying closet, adapted particularly for drying or preserving in a dried condition large quantities of vegetable drugs

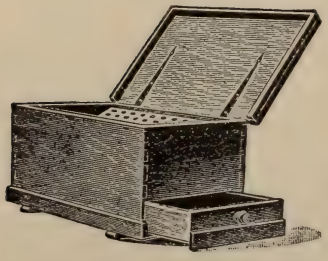
FIG. 25.



Lime Drying Case.

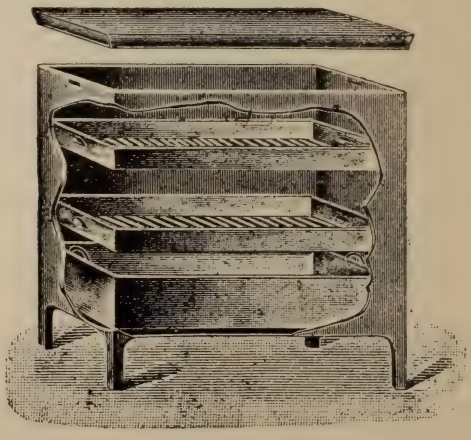
and other medicaments. As shown by Fig. 27, it contains the usual receptacle for lime at the bottom, and several trays for the reception of the drug. The closet is constructed of wood, lined on the interior with tinned iron. The trays are of wood—Pharm. Ztg., lvi (1911), No. 77, 775.

FIG. 26.



Lime Drying-Case.

FIG. 27.

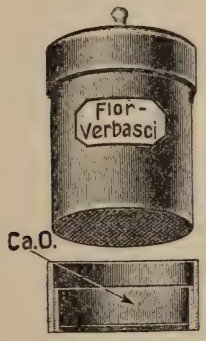


Lime Closet.

Combination Desiccator and Container — A Practical Device.—Th. Meyer has found the container shown by the accompanying drawing (Fig. 28) very serviceable for storing hygroscopic drugs which, according to the

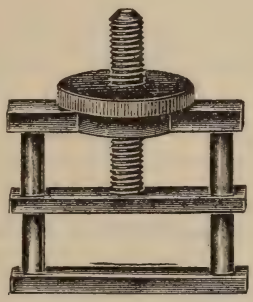
requirement of the Pharm. Germ., should be preserved in a lime closet. The container, which according to size or object may be constructed of pasteboard, wood, or metal, consists of two parts: the container proper, for the reception of the drug, having a perforated, sieve-like, bottom and close-fitting cover; and the shallow desiccator, into which the upper

FIG. 28.



Combination Desiccator and Container.

FIG. 29.



Tube-Clamp.

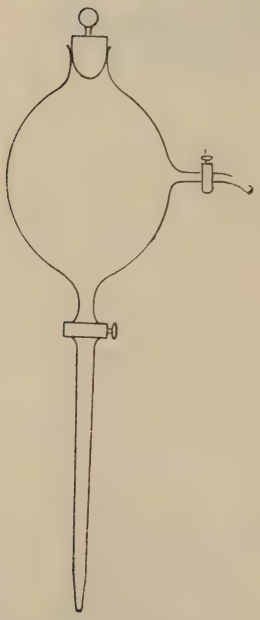
part fits closely, for the reception of the desiccating agent, which may be freshly burnt lime or calcium chloride; but in the latter case, an inner pan of metal or glass must be provided for its reception. In use, a disc of paper is placed upon the sieve-bottom of the container to prevent any of the substance placed therein from falling into the desiccator.—Pharm. Ztg., lvi (1911), No. 22, 218.

Tube-Clamp—Improved Form.—A new form of screw clamp for rubber tubing has been devised and is supplied by Max Zimmermann, Berlin. As shown by the accompanying cut (Fig. 29) a threaded spindle is rigidly attached to the pressure plate which is held in a horizontal position by two opposite bars, over which it is caused to slide, upward or downward, on an even plane by the turns given to the circular thumb-nut on the top bar of the frame. This exerts gradual and even pressure to the tubing and prevents the injury that is liable to result in the use of the ordinary form of screw-clamp.—Pharm. Ztg., lvi (1911), No. 49, 497.

Splash-Preventer for Laboratory Faucets — Simple Device.— F. W. Edward has found the following simple device for preventing the splashing of water from laboratory faucets, very efficient: From a piece of *thin* cotton fabric having a fine mesh, cut two squares of suitable size; place these, one above the other, over the mouth of the faucet, and slip over them a section of rubber tubing an inch in length and of the same bore as the faucet, cutting off the pieces of fabric that project above the rubber. It is better to employ two, or more, layers of *thin* fabric than one thick one, and large faucets usually require three or four layers.—Chem. News. Nov. 25, 1910, 262.

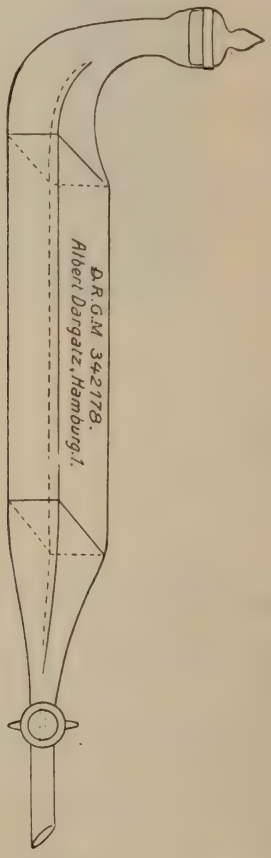
Separatory Funnel—Combination with Washer for Heavy Liquids.—H. M. Atkinson recommends the separatory funnel, modified by the insertion of a cock in about half way up the side of the separator, as shown by Fig. 30, which serves well for washing heavy immiscible liquids. The wash-liquid can be run off from time to time after shaking by the lateral faucet and replaced by fresh liquid—water, solution of soda, etc.—without

FIG. 30.



Separatory Funnel.

FIG. 31.



Separatory Flask.

the necessity of running off the heavy liquid into a flask beneath.—Chem. News, Dec. 23, 1910, 308.

Separatory Flask—A Practical Substitute for the Separatory Funnel.—Dr. Schütte has devised and recommends as a practical substitute for the usual globular form of separatory funnel, a separatory flask, which, as shown by Fig. 31, has the form of a rectangular bottle, resting flat upon one of its faces, narrowing at one end so as to form a glass-stoppered

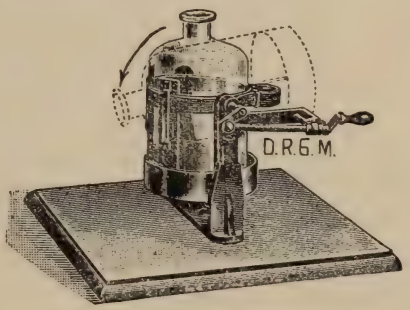
neck extending upward at a right angle, and narrowed at the other end so as to form a straight, glass-stoppered funnel tube. In use, the flask lying flat upon the table, the liquid to be extracted and the immiscible solvent are introduced, and, after securely stoppering the flask, the contents are gently shaken, or the flask is simply shoved to and fro, which, owing to the large surface of liquid exposed, is sufficient to thoroughly extract the liquid in a short time without danger of emulsionizing. The position of the flask is then changed from the horizontal to the vertical, and the separation of the two liquids effected in the usual manner. This separatory flask is supplied by Albert Dargatz, Hamburg.—Pharm. Ztg., lvi (1911), No. 22, 218.

Sediment Tubes—Simple and Convenient Construction.—Emil Schwabe recommends the construction of efficient sediment tubes for microscopic examinations by simply drawing out one end of a small section of thin glass tubing to capillary dimensions and then sealing the capillary. The liquid under examination having been introduced into the sediment tube

FIG. 32.

Sediment tube.

FIG. 33.



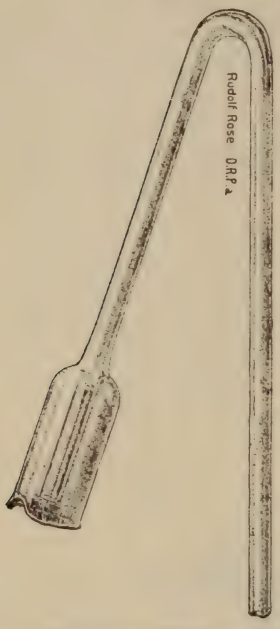
Decanting Apparatus.

(constructed as shown by Fig. 32) it is allowed to stand some time (depending on the nature of the material and experience) so that the sediment may accumulate in the capillary. The opening of the tube is then closed with the finger, the capillary is broken, and the accumulated sediment dropped on the object-slide for microscopic examination.—Pharm. Ztg., lvi (1911), No. 67, 677; from Chem. Ztg., 1910, No. 54.

Decanting Apparatus—A Convenient Laboratory Accessory.—M. Netto has constructed a convenient apparatus designed for decanting liquids from their precipitates without disturbing the latter, which, as supplied by F. Huggershoff, Leipzig, is shown by Fig. 33. The swinging frame, which is constructed to receive bottles of different sizes is set in motion by means of a crank attached by a screw-spindle to its axis, thus gradually and gently inclining the mouth of the bottle downward and permitting the outflow of liquid without danger of disturbing its contents.—Pharm. Ztg., lv (1910), No. 57, 576–577.

Automatic Siphon—A New and Practical Form.—R. Rose (Berlin) has devised and supplies the automatic siphon shown by Fig. 34, which requires simple immersion into the liquid to start it into action. This is effected by means of the small air-chamber attached to the extremity of the short limb of the siphon tube, communication between the two being effected by a small hole in the siphon tube near the apex of the enclosing air-chamber. On placing the siphon in the liquid, the air is only very slowly expelled through this opening and the consequent pressure produced forces the liquid into the siphon and upward until it reaches and passes the bend, whereupon the outflow is established automatically. The utility of this siphon for drawing off poisonous, corrosive, or other objectionable liquids is self-evident.—Pharm. Ztg., lv (1910), no. 78, 790.

FIG. 34.



Automatic Siphon.

Improved Funnel — Advantages.—Philip Blackman describes a new funnel for which he claims various advantages. which is shown by Figs. 35 and 36. The funnel is made of glass and of various sizes. There are two special dimensions: from *A* to *B*, diametrically, (see Fig. 35) is at least

FIG 35.

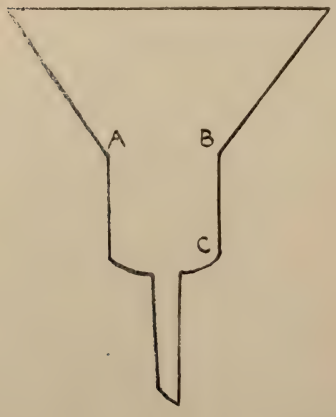
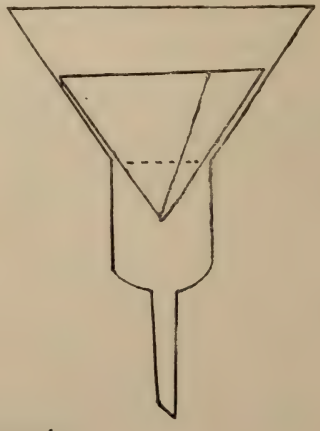


FIG. 36.



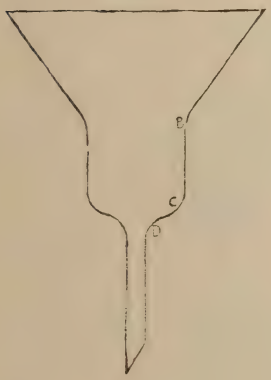
Improved Funnels.

1 inch, and greater in larger funnels. The height from *B* to *C* is not less (preferably somewhat more) than the distance *A* to *B*. The ad-

vantages claimed are that in this improved funnel a great part of the filter cone, all or nearly all that part containing liquid or precipitate, is suspended, and has no contact with the funnel, as shown by Fig. 36, thus affording more perfect and greatly accelerated filtration. The funnels need no flutes or ribs, and there is no necessity for fluted filters, which are liable to give way at the apex of the cone.—Chem. News, July 21, 1911, 35.

In a second communication (Ibid. Nov. 3, 1911, p. 211), the author describes an important improvement upon his new funnel, which consists in rounding of the bends at *A*, *B*, *C*, and *D*, as shown in the accompanying cut (Fig. 37), thereby adding greatly to the strength of the funnel, in

FIG. 37.



Improved Funnel.

FIG. 38.

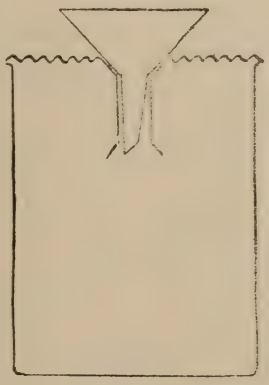
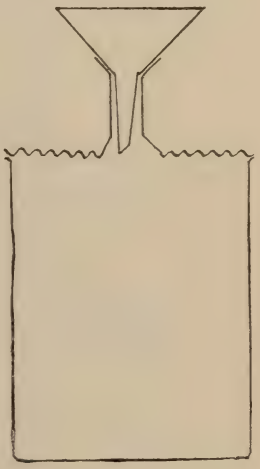


FIG. 39.



Funnel Support.

which, as originally constructed, the sharp bends are a great source of weakness.

Funnel Support—A Convenient Form.—Philip Blackman describes a glass funnel support for which he claims certain advantages in conducting filtrations in the analytical laboratory. It consists of a circular disc, in various sizes (from 4 to 12 inches in diameter), with a number of concentric circular flutes or ribs, each flute or rib being approximately about one-third of an inch wide and deep, an upright tube rises from the center of the disc (1½ inches in length and of uniform internal diameter of half an inch), each end being funnel-shaped so that a funnel may fit in and rest without shaking, in either position of the disc, whether the extension is downward, as shown by Fig. 38, or, by reversing the disc, upward, to raise the funnel, as shown by Fig. 39. This disc, which will fit any beaker of smaller diameter than its own, will hold any sized funnel and at the same time

serve as a cover of the beaker. The flutes or ribs prevent slipping from the rim of the beaker, or from that of any other wide-mouthed vessel. By inverting the position of the support, it will accomodate itself to the depth of the beaker or the length of the funnel stem, while dust is excluded and evaporation of the filtrate is prevented in either position.—Chem. News. July 21, 1911, 30.

In a second communication (Ibid, Nov. 3, 1911) the author recommends that the above-described funnel support should be made of aluminium. He has abandoned glass owing to its brittleness due to the special process necessary to produce the fluting of the disc.

Funnel Support—Convenient Form for Analytical Operations.—The "Vereinigten Fabriken für Laboratorienbedarf" (Berlin) supply the simple and convenient form of funnel support, illustrated by Figs. 40 and 41, which

FIG. 40.

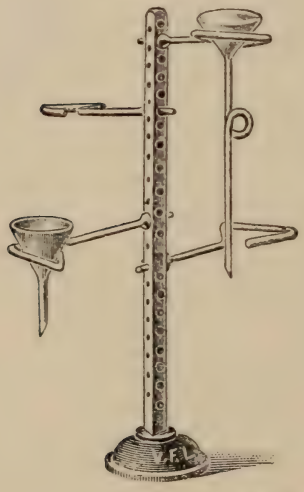
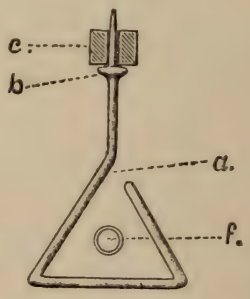


FIG. 41.



Funnel Support.

requires little explanation. Instead of the ring-supports of the ordinary form, these, as shown by Fig. 41, are triangular, open at *a* for the convenient introduction of the funnel stem without disturbing its attachments, if there be any, and these supports are provided with a shoulder, at *b*, which limits its introduction into the perforation on the upright, as shown by *c*. The triangular supports are constructed of glass rods; the perforated upright, of hard wood and well oiled. These several parts are made to fit snugly; but to hold the triangular support in position, a small rubber ring is slipped over the protruding end of its stem.—Pharm. Ztg., lvi (1911), No. 30, 305; from Chem. Ztg., 1911, No. 31.

Wooden Funnel Rings—Improved Construction.—The wooden funnel

supports as ordinarily constructed suffer from the effect of warping and the wearing of the wooden screws holding them in position. This defect is overcome by Aug. Kumm by fitting the wooden rings into a metal holder which sliding on the rod of the stand is held in position by the metal set-screw. The improvement is shown by Fig. 42, and the improved form of support is supplied by the firm of Franz Hugershoff, Leipzig.—Pharm. Ztg., lv (1910), no. 78, 790.

Vacuum Filter Device—Simple and Efficient Form.—Theo. Grzeschik describes the simple contrivance for quick filtrations, shown by Fig. 43,

FIG. 42.

Wooden Funnel Rings.

FIG. 43.

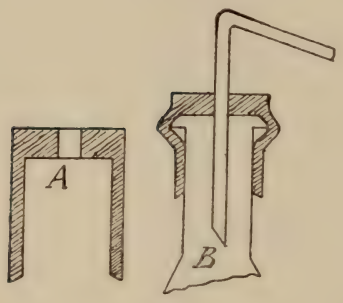
Vacuum Filter Device.

which is supplied by Gustav Mueller, Ilmenau. It consists of a perforated rubber stopper bearing a funnel support into which three different-sized glass funnels are accurately fitted by grinding, and from which a short tube extends laterally for connection with the air pump. In use, the funnel of required size is inserted and made air-tight by applying a little fat to the ground surface, or even the application of a drop of water to these surfaces may be made to answer the purpose. As receiving vessel for the filtrate any flask that accommodates the rubber stopper will answer, and a change may thus be effected expeditiously.—Pharm. Ztg., lv (1910), no. 78, 790; from Chem. Ztg., 1910, No. 107.

Perforated Rubber Caps—Advantage over Perforated Stoppers.—The "Berlin Society for Laboratory Supplies" has introduced elastic rubber caps as substitutes of perforated stoppers for making connections of flask with glass tubes and other apparatus, which are shown in illustration by Fig. 44, "*A*" being a perforated cap, while "*B*" shows the manner of its application. The advantage of this expedient, which is on the principle of the tube connections by means of elastic rubber tubing as ordinarily

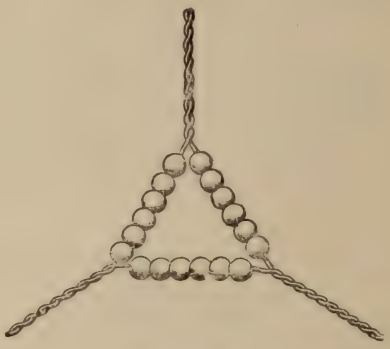
practiced, consist in affording absolutely air-tight connections even if the parts to be connected are of irregular shape; in imparting to the connection a certain elasticity in place of the rigidity of ordinary stopper connections; and in the celerity with which connections can be made without danger of breakage during adjustment of the connected parts or their removal from place to place. These elastic caps are supplied in different sizes (and perforations? Rep.).—Pharm. Ztg., lvi (1911), No. 49, 497.

FIG. 44.



Perforated Rubber Caps.

FIG. 45.



Clay Crucible Support.

Clay Crucible Supports—Improved Construction.—Dr. von Heygendorff points out some of the disadvantages of the ordinary form of clay-triangles used as crucible supports, such as their inflexibility and their liability to fracture during the heating, and recommends the improved form shown by the accompanying drawing (Fig. 45). This consists of stringing clay beads, perforated through their center and slightly flattened on opposite sides, upon wires, and twisting these wires so as to form a regular triangle. The result is an elastic support that will accommodate crucibles of different sizes (within certain limits), while the occasional fracture of one or the other of the beads—which seldom occurs—does not interfere with the operation in progress. These "bead-" or "pearl-" triangles are supplied in different sizes.—Pharm. Ztg., lvi (1911), No. 49, 497.

Analytical Flasks—New Form.—Herzka has devised a new form of analytical flasks, shown by Figs. 46 and 47, which present some marked advantages over the ordinary Erlenmeyer flask. In the new form the body and neck are obliquely extended in one direction from a flat horizontal bottom, the length of the neck being short, as shown in Fig. 47, when the flask is intended for washing gases, or elongated, as may be desired when the flasks are intended for boiling on distillations, as shown in Fig. 46. In either case, inconvenience and loss by spirting is excluded, while other advantages obviously present themselves which will doubtless

lead to their adoption in many analytical operations. The flasks are manufactured by Kob & Co., Stützerbach i. Th.—Pharm. Ztg., lv (1911), No. 94, 936.

FIG. 46.

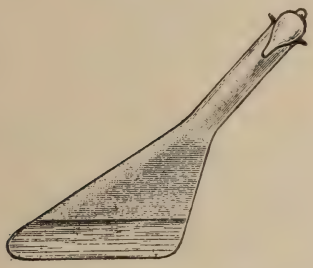
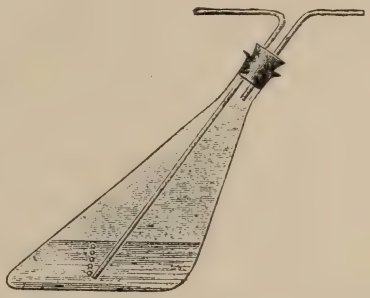


FIG. 47.



Analytical Flasks.

Glass Bottles—Their Origin.—It is stated in "National Bottlers' Gazette" that in 1338, Humbert, the Dauphin of France, offered the use of his forest land at Dauphine to a glass smith, for the purpose of manufacturiug glass bottles. The grant was given on condition that the Dauphin be supplied with 3,000 bottles a year. This event is noteworthy not only because it shows the young prince's partiality for bottles, but also because the date marks the first time in history that glass bottles were manufactured on a large scale.

In 1268 at Venice there was an exhibit of glassware, which included decanters and scent bottles. These were very elaborately worked up in many artistic decorative effects; but the inception of the true, or at least the modern significance of the bottle remained for the early Saxons. They had a crude glass vessel which they called "wydr". This is said to have meant "welcome", and even to this day the same spirit of fellowship is attached everywhere to the bottle. It is interesting in this connection to mention that the earliest monuments of the Egyptians, which are some 4000 years old, show crude pictures of glass bottles containing wine; so the bottle business is by no means an infant industry.—Nat. Drugg., January, 1911, 9.

Ampoules—Simple Directions for Filling them on Prescription.—After calling attention to the advantages of dispensing and using sterilized solutions in ampoules, such as absolute sterility, permanence and accuracy of dose, Thos. Stephenson suggests the following simple method of filling them by the aid of an ordinary hypodermic syringe: "The syringe should first be sterilized in the usual way. Then an ampoule is taken and the pointed end removed, as near the point as possible, by snipping sharply with scissors (holding the point downwards), or by scratching with a file and breaking off. The necessary quantity of solution, plus one or two minims to

allow for loss in removal, is then drawn into the syringe, the needle inserted at the open end of the ampoule, and pushed well down to prevent the liquid collecting in the neck, and the solution injected into the bulb." "The ampoule has now to be sealed. This is done by holding for a moment or two in a Bunsen flame. If held too long in the flame the liquid is liable to become volatilized, with the result that a bubble is blown in the end, which will not be air-tight. With a little care, however, the sealing can be effected rapidly and securely."

The filled and sealed ampoules must, of course, be sterilized—an operation which varies according to the substance in solution. Ordinarily this consists of placing them in a beaker of water and heating this in a pan of boiling water for an hour. But in any case the ampoules should never be filled more than two-thirds full, in order to allow some elasticity for the contents during sterilization. It is also advisable to prepare a few more than the prescribed number of ampoules, to allow for accidental breakage. This is ascertained (as is well known) by coloring the water in the beaker with aniline blue, which penetrates into the fractured ampoules.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1910, 447–450.

Ampulles—A New and Economical Form.—Otto Schommartz has devised a new and practical form of ampulles which possess the advantage of being easily filled and are economical since they can be refilled after the contents have been consumed. The new ampulles, which are shown by Fig. 48,

FIG. 48.

Ampulles.

flare out funnel-shaped at the neck and are hermetically closed automatically by means of a rubber disc laid upon the opening during sterilization. They are supplied under the specific name of "Vellox-Ampuls" in assortments suitable for physician's use as shown in the drawing.—Pharm. Ztg. lvi (1911), No. 77, 775.

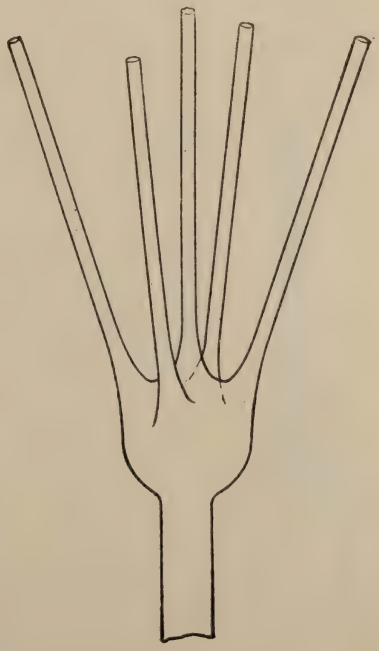
Ampulles.—A "Universalapparatus" for cleansing, sterilizing and filling ampulles with sterilized liquids is shown in several cuts and its use and application are described in detail in Pharm. Ztg. 36, lv (1910), No. 104, 1047.

Ampulles—Directions for Testing and Filling them with Sterilized Solutions of Morphine and other Alkaloidal Medicaments.—Th. Budde gives practical directions for the examination of ampuls, which must be free from alkali, and filling them with alkaloidal solutions completely sterilized. Samples of the ampules are filled with phenolphthalein solution, heated while open in a boiling water bath 5 minutes, then closed by fusing the open end, and sterilized for one hour at 100° C., during which the contents should remain colorless. The ampules having thus been proven suitable, they are filled with the alkaloidal solution, heated, sealed, and sterilized in the same way. So, for example, morphine hydrochloride is dissolved in $\frac{N}{1000}$ hydrochloric acid, the solution filtered, and filled into ampules by the aid of a filling apparatus —Pharm. Ztg., lvi (1911), No. 19, 193, from Veröff. a. d. Geb. d. Militär-San.-Wes., No. 45.

Ampulles—A New Form.—Wulff-Hillen has devised a new form of ampull, designated as the "Schnabel" model, which is shown by Fig. 49.

FIG. 49.

FIG. 50.



Ampulles.

It is intended for the reception of medicaments that are to be given in drop doses, such for example as sterilized eye-drops, and is so constructed as to deliver only drops of the "normal size" prescribed by the Phar. Germ. The ampulles are supplied by the firm of Fridolin Greiner, Neu-

haus. They are most conveniently filled from a burette by means of a pravaz-needle.—Pharm. Ztg., lvi (1911), No. 4, 36.

Ampulles—Apparatus for Convenient Steaming and Sterilization.—E. Deussen describes a contrivance (Fig. 50) which serves for the convenient steaming out and sterilization of ampulles. It consists of a short glass tube, expanded at one extremity so as to form a chamber from which a number of small tubes radially rise as shown in the illustration. This is attached with a section of rubber tubing to a glass tube of the same calibre, about 30 Cm. long, bent in its center so as to form an elbow and fitted by means of a rubber stopper into a 1 liter flask of Jena glass. This flask is about half-filled with distilled water, and heated, the steam produced passing through the small glass tubes of the contrivance—which is suspended by means of the rubber tubing over a basin—into the ampulles placed over their orifices, while the condensed water drops into the basin beneath. The steaming consumes from 10–15 minutes and at the same time effects the sterilization of the ampulles. Obviously the size of the little steam-tubes must conform to the particular size of the ampulles to be tested.—Pharm. Ztg., lv (1910), No. 93, 936; from Zschr. f. Unters. d. Nahr.-u. Genussm., 1910, No. 8.

FIG. 51.

Eye-Dropper and Bottle.

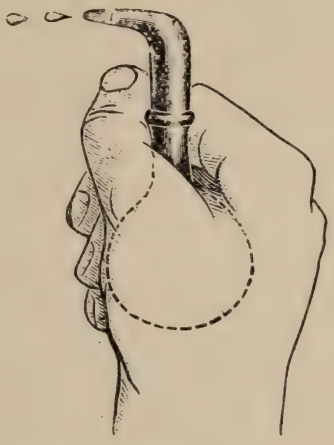
Combination Eye-Dropper and Bottle—A New "Sterile" Form.—Machowicz and Kuhle, Breslau, supply the combination eye-dropper and bottle, shown by Fig. 51, which can be kept perfectly sterile since it consists practically of glass only. The dropper consists of a double pipette, an outer one which is ground to fit into the neck of the bottle, and a shorter inner one, attached to the outer by a spiral spring of nickel-coated steel, and acting as a piston. On pressing the piston down and quickly releasing it, it is suddenly flung upward and draws a portion of the medicament into the outer pipette, from which it may then be dropped into the eye. Sterility is readily maintained, and the various parts are readily cleansed for the reception of other medicaments.—Pharm. Ztg., lv (1910), No. 68, 686.

Combination Eye-Dropper and Flask—New Form.—Dr. Driver has devised the combination eye-dropper and flask shown by Fig. 52, which possesses some marked advantages over other forms. It is constructed entirely of glass, consisting of a small flask into which a beak-shaped dropper is accurately fitted by grinding. In use, the flask is not quite half-filled with the medicament, and the dropper inserted with gentle pressure and a slight turn. The contents may then be sterilized by heating the flask over or in the direct flame, and the sterilization so effected is permanent. The drop-

ping is effected by inclining the flask so that the beak of the dropper is

FIG. 52.

FIG. 53.



Combination Eye-Dropper and Flask.

completely filled, then enclosing the flask in the hand as shown by Fig. 53, whereupon the warmth of the hand will cause the medicament to be delivered from the beak at regular intervals, drop by drop. The dropper is supplied by the firm of C. Stiefenhofer, Munich.—Pharm. Ztg., lv (1910), No. 78, 790.

FIG. 54.

Bottle and Dropper.

Eye-Water Bottle and Dropper — Practical Stopper.—The accompanying cut (Fig. 54) illustrates a practical device for fastening the stopper, bearing the dropper, into the neck of eye-drop bottles. The device is notable on account of its simplicity and security.—Pharm. Ztg., lvi (1911), No. 4, 36.

FIG. 55.

Injection Bottle.

Injection Bottle Improved Form.—The requirement that all remedies for external application shall be dispensed in bottles of hexagonal form has led to the suggestion of a number of patterns adapted to special uses, among others such required for injections (see Proceedings 1906, 613). It has been

found, however, that in liquids containing insoluble substances, such as calomel, mercuric salicylate, etc., these settle to the flat bottom of the bottle and adhere so tenaciously to the corner that even violent shaking fails to remove them completely. This has suggested the improved form of injection bottle shown by Fig. 55, the improvement consisting in making the bottom of the bottle concave (rounded) on the interior, and introducing a small ball, which facilitates the admixture of the solid and fluid contents on rotating or shaking.—Pharm. Ztg., lvi (1911), No. 15, 151.

Mortars—Cardinal Requisites for Cleaning.—Carl E. Freeman, who does not consider it beneath his dignity to give some advice on the subject of "cleaning mortars," prefaces his remarks by the dictum—"Always have hot water and soap, with plenty of the latter;" and in concluding his very interesting and practical observations, says: "To clean mortars have plenty of soap and warm water, in a few cases alcohol or benzine, and once in a great while use acid to remove certain substances, but always have the sawdust box handy."—Proceed. N. Y. State Pharm. Assoc., 1910, 204–205.

Mortars—Removal of Chemical Stains.—When a mortar has become stained or dirty and will not respond to ordinary methods of cleaning, Howard S. Carpenter has found a successful way to grind up about a half ounce of potassium bicarbonate in the mortar and add a sufficient amount of sulphuric acid to make a paste; then spread the mixture on the sides and bottom of the mortar and let it stay there about an hour or over night. On washing the mortar in the morning it appears absolutely white and clean enough to eat out of.—Bull. Pharm., July, 1910, 294.

Glass Objects—Effective Method of Cleaning.—To clean glass objects, Herbert J. Perry recommends the following effective method: Moisten calcined magnesia with benzine and keep the mixture in a glass-stoppered bottle. When an object made of glass is to be cleaned, apply the magnesia with a rag. With this preparation dirt may be quickly removed from the window-panes, graduates, and other things of glass.—Bull. Pharm., Sept., 1910, 384.

Plate Glass—Efficient Method of Cleaning.—Charles S. Herron describes the following efficient method of cleaning plate-glass windows, whereby the peculiar greasy deposit formed upon them by the combustion of illuminating gas is completely removed. If after the ordinary procedure of cleaning, a small sack of ordinary cheesecloth be filled with lamp black and the glass thoroughly polished with this and then with a clean cloth, it will assume a brilliancy unobtainable by any other means. —Proc. Pa. Pharm. Assoc., 1911, 314.

Cleaning Fluid for Utensils—Formula.—R. F. Graves gives a formula for a cleaning fluid composed of solvents that cut almost anything insoluble in water: Acetone, 10 p.; benzole, 30 p.; denatured alcohol, 60 p.

He keeps a bottle of this mixture convenient to the sink and finds that a dram or two of it will dissolve out any deposit that water will not affect.—Bull. Phar., April, 1911, 165.

Cedar Wood Cigar Boxes—Economical Uses.—H. C. Bradford points out a variety of uses to which the empty cedar wood cigar boxes can be put. Instead of throwing them away or breaking them up for kindling, they should be carefully preserved, for cedar wood is becoming from year to year a scarcer article, and even the thin boards of which the cigar boxes have been constructed will acquire in time a certain commercial value. They serve well for storing certain drugs that are liable to the attack of insects, and if a single box is too small for this purpose, with a little mechanical ingenuity a number of them can be joined so as to make a larger one. In fact they serve for the storage, temporary or permanent, of a great variety of articles which are ordinarily but ill provided for. Where time and material are convenient, it pays to add little niceties and embellishments to these containers, placing them on an equal footing with the more expensive ones acquired by purchase.—Merck's Rep., Sept., 1910, 247–248.

Prescription File—A Practical Idea.—George W. Hague has adopted the following method of filing and storing prescriptions and found it all

FIG. 56.

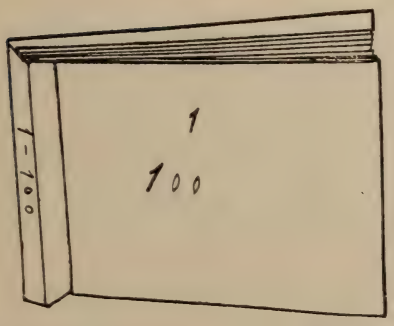
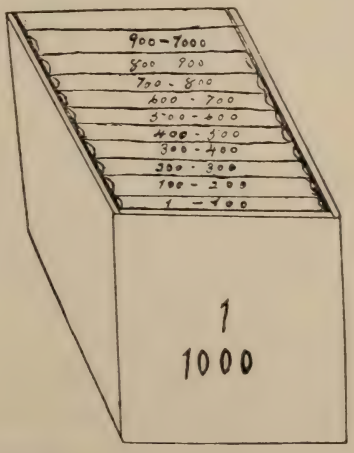


FIG. 57.



Prescription Files.

that is to be desired: The prescriptions are taken off the small catch file in lots of one hundred each; these are of course irregular in size, some are trimmed, and when a blanket sheet is in the lot, it is folded to reduce it to the regular size; these are made up into a book with a heavy piece of brown wrapping paper serving as its cover. The cover extends slightly over the edges, the same as the cover extends over the pages of any or-

dinary book; a McGill paper fastener, or any other kind, is run through the center of the closed end and bent back (see Fig. 56), and the book, which is now finished is numbered both on the cover and back—in case of the first book—1 : 100. These books are put away in small wooden or tin boxes, each containing ten books and, in case of the first series, the front of the box is marked—1 : 1000 (see Fig. 57).—Meyer Bros. Drugg., July, 1911, 200.

C. PREPARATIONS.

ACETA.

Sabadilla Vinegar—Cause and Prevention of Turbidity.—Dr. O. Langkopf finds that the turbidity resulting after several weeks standing in sabadilla vinegar (popularly used for the destruction of head lice), is referable to a peroxydase which he has determined along with two other enzymes in the aqueous extract of sabadilla seeds. To prepare a permanently clear vinegar from these seeds, the peroxydase must be destroyed by boiling 100 p. with 500 p. water half an hour, transferring the mixture after cooling into a wide-mouth bottle, adding sufficient water to make 850 p.; then adding 100 p. alcohol and 180 p. diluted acetic acid (the G. P. diluted acetic acid contains 30 per cent. of absolute acid, Rep.) and, after standing 8 days, subjecting the mixture to expression and filtration. The author's observation is important, since sabadilla vinegar has been admitted into the new German Pharmacopœia and is required to be clear.—Pharm. Ztg., lvi (1911), No. 11, 107.

AQUÆ.

Stronger Ammonia Water—Precaution in Opening Container—Writing from Adelaide, Cape Colony, A. Lomax calls attention to the necessity for caution when opening bottles containing stronger ammonia water. He advises to wrap a wet towel around the bottle and set the container outside in the shade for at least half an hour, keeping the towel constantly wet. As an additional safeguard, he advises to turn the face away from the bottle on opening it, at the same time leaving the towel over the stopper.—Bull. Pharm., May, 1911, 211.

Distilled Cinnamon Water—Development of Fungus and of a Benzene-like Odor.—J. Tait directs attention to the development of a fungus and of an odor resembling benzene, together with crystals of cinnamic acid, in a sample of cinnamon water which had been distilled from Ceylon cinnamon bark by the official (B. P.) process. He concludes that the formation of crystals of cinnamic acid is due to oxidation of the cinnamic aldehyde, which constitutes at least 50 per cent. of the essential oil. A similar decomposition does not appear to have been observed in cinnamon water made by dissolving the essential oil in water. Possibly the presence

of secondary bodies in the water distilled from the bark may facilitate the process of oxidation. The researches of Oliviero and Herzog and Ripke explain the development of the benzene-like odor. In the case of the diluted water the use of tap water explains the growth of fungus, and apparently this growth has induced the complete destruction of the cinnamic acid. A microscopical examination of this fungus indicates that it is neither *Aspergillus* nor *Penicillium*. It appears to be a species of *Mucor*. —Pharm. Journ. and Pharmacist, Dec. 30, 1911, 886.

Aqua Laurocerasi—Improvement of the Process of the French Codex.— F. Pancier observes that cherry-laurel water, even when prepared in strict conformity with the directions of the French Codex, occasionally fails to contain the prescribed quantity of 1 per cent. of hydrocyanic acid. This may be avoided if instead of contusing the leaves before distillation they are cut up as finely as possible. Furthermore, it is advisable not to continue the distillation to the end in one operation, but to adopt a practical method, setting aside the first one-third of the distillate, which contains practically all of the HCy, and to adjust this with the subsequent distillates to the required strength of 1 per cent. So prepared, he finds that cherry-laurel water, rationally preserved, will retain its titre for a long time unimpaired. The author ascribes the deterioration of cherry-laurel water, on keeping, mentioned by different authors, to be due to the addition of dilute hydrocyanic acid in order to compensate for any deficiency, believing the added HCy to possess less stability than the naturally produced acid.—Pharm. Ztg., lvi (1911), No. 8, 807; from Bull. des Sci. Pharmacol., 1911, No. 9.

Cherry laurel water—Method of Distinguishing the Natural from the Artificial or Adulterated Product.—From a comprehensive study on the composition and adulterations of cherry laurel water F. de Myttenaere concludes that it is impossible to distinguish the adulterated or spurious product from the natural by the simple titration of the free hydrocyanic acid or of its aldehyde. In his opinion the genuine product should respond to the following additional requirements:

(1) Cherry laurel water should give a red color, free from blue, with an alcoholic solution of Congo-red. (2) The filtrate obtained from 10 Cc. of cherry laurel water to which 8 Cc. of $\frac{N}{10}$ silver nitrate solution has been previously added, must not give a precipitate on the further addition of silver nitrate. (3) 10 Cc. of cherry laurel water, after faint acidulation with HCl, should not be affected by sulphuretted hydrogen, and potassium ferrocyanide in an acetic acid solution must not produce turbidity nor a brown precipitate—this test determining the absence of copper. (4) 10 Cc. of cherry laurel water should not yield an appreciable residue on evaporation.—Pharm. Ztg. lv (1910), No. 72, 724; from Journ. de Pharm. d'Anvers, 1910, No. 14.

Cherry-Laurel Water—Preservation, Clarification, etc.—A. Astom points out that cherry-laurel water can be effectually preserved only by keeping it in completely filled, well-closed bottles, protected from light. The loss in hydrocyanic acid in open bottles, particularly when they are not filled, is very considerable, and this loss is greatly increased by the influence of light. The author advises the use of small brown-glass bottles for storing this water and also for dispensing it. Moreover it must be tested from time to time regarding its strength, and should be renewed more frequently than is at present required by the French Pharmacopœia, which directs the renewal of distilled waters annually. Regarding the clarification of cherry-laurel waters, the author cautions against the use of animal charcoal, which is capable of absorbing and holding considerable quantities of HCN. This absorption varies with different kinds of charcoal and the quantity, but time of exposure or the temperature appears to be of comparatively small influence.—Pharm. Ztg., lvi (1911), No. 54, 545; from Jour. de Pharm. et Chim. 7 Ser., vol. iv (1911), No. 1.

Rose Water—Formula for a Cheap Commercial Preparation.—H. S. Carpenter gives the following formula for a rose water suitable for making lotions, etc., which, although by no means a U. S. P. product, is quite as satisfactory and considerably cheaper to manufacture:

White rose extract	½ ounce.
Boric acid	1½ ounces.
Aqua	1 gallon.
Purified talc	2 ounces.

Mix and filter. Mix the boric acid and talc with the white rose perfume and gradually rub up this mixture with warm water. Pour it into a filter and add water through the filter to make up the required amount.—Bull. Pharm., Mar. 1911, 119.

CATAPLASMA.

Cataplasma Kaolini—Question of Improvement.—Dr. Philemon E. Hommell briefly discusses the various improvements that have been proposed for the preparation of Cataplasma Kaolini, U. S. P. He has found the following improved formula by J. G. Dunn, to be satisfactory, yielding a very smooth, desirable product, and believes the preparation should be retained in the U. S. P.;—Kaolin, 550 Gm.; glycerite of boroglycerin, 261 Gm.; glycerin, 181 Gm.; methyl salicylate, 2 Gm.; thymol, 0.5 Gm.; oil of peppermint, 0.5 Gm.—Proceed as directed in the U. S. P., except that the glycerite of boroglycerin and glycerin are added at the same time. —Proc. N. J. Pharm. Assoc., 1910, 51.

Electric "Cataplasma"—Construction and Method of Application.—J. Marcuse has for sometime employed a device of Hilzinger for the direct application of heat to various parts of the body, using electricity as the

source of heat. These electric "cataplasms" are composed of soft pliable knitted fabric containing a system of resistance wires. Insulation is obtained by means of glass beads. The wires are placed between layers of asbestos. The apparatus can be attached to any source of current, not exceeding 120 volts in tension, and they can be exactly adjusted to any required degree by regulating the flow of current. The "cataplasms" are made of different shapes to fit different parts of the body.—Pharm. Journ. and Pharmacist, Mar. 4, 1911, 297: from Nouv. Remèdes, *28* (1911), 13.

CHARTA.

Curcumin Paper—Preparation.—The "Vierteljahrschrift f. prakt. Pharm." (1911, 72) recommends the preparation of curcumin paper by dipping sheets of the best white filter paper in a solution of 0.1 Gm. of curcumin in 100 Cc. of 90 per cent., drying the paper in the dark and so perserving it in well-stoppered bottles.

Curcumin is made for this purpose by drying turmeric at 100° C., extracting it in a Soxhlet with petroleum benzin for four hours, then drying, and extracting it in the Soxhlet with benzene (benzol) for 8 or 10 hours. On cooling, the curcumin separates from the benzol solution within 12 hours.—Pharm. Zentralh., lii (1911), No. 34, 900.

CARBASSA.

Standard Surgical Dressings—Question of official Formulas and Requirements.—Fred B. Kilmer contributed a highly interesting paper at the 1911 meeting of the New Jersey Pharmaceutical Association, in which he discussed the question of admitting formulas for the preparation of surgical dressings into the U. S. P. and N. F. Coming from a practical manufacturer of these important surgical requisites, who has doubtless considered the subject in all its bearings, the following summary of the thoughts embraced in this paper deserves the careful consideration of these engaged in the revision of the two standard works of authority. He says:

"The rapidly changing conditions of surgical methods would not seem to warrant the insertion in the United States Pharmacopeia or in the National Formulary formula for the preparation of antiseptic surgical dressings. Any standard adopted for medication for surgical dressings would be liable to become valueless long before the next revision. A standard for antiseptic dressings once embodied in the Pharmacopeia would become complicated in the administration of food and drug laws, by the constantly changing requirements of surgical practice." "It might be possible to establish official methods of assay by which antiseptic dressings could be judged. The standard for absorbent cotton in the eighth revision of the United States Pharmacopeia should be revised and a standard is suggested. It would be possible to establish a standard

by which surgical gauze and dressings made therefrom could be judged." "The principal requirements for surgical dressings made of cotton or gauze at the present time are purity and sterility; such dressings are known as plain aseptic dressings."

In the author's opinion, neither the facilities of the practicing physician, the hospital, or those of the ordinary pharmacist are adequate for the preparation of this class of material, like that of serums, toxins, and the like, requiring special training and special facilities for their manufacture. Until economic conditions shall greatly change it is the author's opinion that the preparation of this class of material had best be relegated to those possessing the required facilities.—Proc. N. J. Pharm. Assoc., 57, 1911.

Medicated Gauzes—Extemporaneous Preparation.—George M. Beringer, after pointing out the requirements and demands made for medicated gauzes suitable in surgery, makes some practical remarks concerning their preparation extemporaneously by pharmacists and gives formulas for quite a number, and gives individual details which must be consulted in the original paper. In general it may be said that suitable material can now be had, already prepared, in the market. A satisfactory material contains about 12 threads to the centimeter, both on the woof and on the warp, and is conveniently used in widths of 90 Cm. (1 yd.). One meter of this weighs about 25 Gm. It should be free from chlorine and starch or gum-like material. Needless to say, the utmost cleanliness must prevail in carrying out the various operations required to medicate the gauzes in demand, which consist of two forms—moist and dry. Hence directions for both forms are given and here produced in the following examples:

Plain Absorbent Gauze, "Dry."—The gauze should be cut into convenient lengths and rolled or folded into suitable bundles, wrapped in sterilized parchment paper and placed in a steam bath for one-half hour. It should then be removed and placed in previously sterilized cartons or wrapped in sterilized tough, heavy paper.

Plain Absorbent Gauze, "Moist."—Cut into suitable lengths, then sprinkled with sterilized distilled water containing 5 per cent. of glycerin and packed in previously sterilized amber glass jars. The filled jars, with the caps loosely placed, should then be resterilized in a steam bath for one half-hour, after which they should be immediately sealed.

Iodoform Gauze, 10 per cent. "Dry."—Iodoform, 10 Gm.; acetone, 100 Cc.; sterile gauze, 100 Gm. Dissolve the iodoform in the acetone and pour over the gauze loosely placed in a sterilized jar, or other suitable container, fitted with a close cover. Cover and allow to stand about fifteen minutes or until evenly moistened. Remove from the jar and drive off the acetone by waving in the air. Immediately wrap in sterilized parchment paper. Resterilize in steam bath for fifteen minutes and then enclose in a tight carton, or tough paper wrapper, previously sterilized.

Iodoform Gauze, 10 per cent, "Moist," is prepared from the above dry gauze, by sprinkling with freshly sterilized distilled water containing 5 per cent. of glycerin (about 75 Cc. will be needed for each 100 Gm. of gauze). Allow to stand in a covered sterile jar till the moisture is evenly distributed. Pack into sterilized amber glass jars and resterilize, with lids of jars loosely placed, in a steam bath for fifteen minutes. Hermetically seal the jars immediately upon removal from the sterilizer.

Resterilization for only fifteen minutes is directed for iodoform gauze because of the ease with which iodoform is decomposed by heat. Prepared in this manner, the iodoform is so firmly attached to the gauze that very little is washed off when immersed in water. With the starch paste suspension method the secretion from a freely discharging wound, or the condensed steam from sterilization is sufficient to flush it from the material.

Formulas and directions are also given by the author for the preparation of the following gauzes, both "dry" and "moist:" *Thymol Iodide* (5 per cent.); *Sublimated or Bichloride* (1 : 1000); *Phenolated or Carbolized* (5 per cent.); *Borated* (10 per cent.); *Picric Acid* (2 per cent.). The manipulation is in the main the same as in the typical formulas above given—though differing in some of them on account of the difference in solvents.

In conclusion Mr. Behringer mentions that a few formulas for gauzes were given in a previous edition of the National Formulary, but were omitted in the last revision, probably because, as there directed, they could not be satisfactorily prepared by the pharmacist. Then, too, they were not of the character demanded by modern practice. The author believes that some of the submitted formulas might be admitted into that work with advantage. It has been argued again and again that official recognition would be a mistake, because the pharmacist lacks the facilities, and it has been hinted that he has not the intelligence and training necessary for the careful preparation of surgical dressings. These arguments, to say the least, are not very complimentary to the ingenuity and ability of the American pharmacist, especially in view of the fact that his brethren in Germany, Austria, Switzerland, Belgium, the Netherlands and Italy, prepare such products from formulas in their respective pharmacopœias. —Amer. Journ. Pharm., April, 1911, 178–185.

"Creaking" Absorbent Cotton—Method of Production.—W. Roescheisen mentions that while formerly the pure acid- and fat-free absorbent cotton, having a soft texture, was exclusively in demand for bandaging and wound treatment, more recently a variety, having a somewhat brittle texture and producing a "creaking" sound when pressed with the hand, has found more favor in surgical practice. He states that this property of "creaking" is imparted to the cotton after bleaching in the usual manner, by immersing it in a bath of dilute soap solution, following this, as a rule, with a bath of dilute acid, without subsequent washing in either case be-

fore drying. Cotton so prepared, is apparently quite absorbent and sinks in water more rapidly than the soft absorbent cotton; but in reality it is not as absorbent as the purified cotton, sinking in water more rapidly on account of its greater weight and losing this property even after it has been kept for some time. Its popularity is evidently based on the assumption that its apparent absorbent quality is due to its greater purity; whereas, in fact, the so-called "creaking" variety of cotton is quite impure, containing traces of soap, or of fatty acids liberated by the acid bath.—Pharm. Ztg., lvi (1911), No. 7, 67.

Some further light is thrown upon the characters and manufacture of the so-called "creaking cotton" in a rejoinder of Dr. A. Russow to the article of Roescheisen. Dr. Russow states that this kind of cotton is produced by washing purified cotton, after the water-bath, until only very minute traces of soap remain in the fabric, whereupon it is passed through a bath consisting of very dilute hydrochloric or sulphuric acid, by which the traces of soap are decomposed. The minute traces of fatty acids thus liberated communicate the peculiar property of "creaking" to the cotton, but, this author claims, do not in any way interfere with the absorbent property.—*Ibid.*, No. 13, 127.

COLLODIUM.

Collodium, Phar. Germ. V—Nitrification of Cotton.—The Pharm. Germ. V directs that the cotton should remain in the acid mixture 24 hours. It is suggested (very pertinently) that it would have been better to direct this exposure to the acids to be limited "until the cotton is completely nitrated and completely soluble in the prescribed mixture of ether and alcohol.—Pharm. Ztg., lvi (1911), No. 29, 292.

ELIXIRIA.

New N. F. Elixirs—Formulas.—George M. Beringer communicates formulas for the following new elixirs which have been proposed for admission into the National Formulary:

Elixir Calcis Lactophosphatis.
Elixir Glycerophosphatum.
Elixir Glycerophosphatum Compositum.
Elixir Formatum.
Elixir Formatum Compositum.

Also a formula for the

Spiritus Cardamomi Compositum,

which is an ingredient in some of these "Elixirs." These several formulas may be consulted in Proc. N. J. Pharm. Assoc., 1910, 64–68.

Elixir Acetanilid Compound—Formula.—Discussing the subject of headache remedies, Prof. Philemon E. Hommel, speaking particularly of acetanilid, expresses the belief that if it is exhibited in a fluid form, com-

bined with efficient heart stimulants, more satisfactory results are obtained than in the usual form of tablets, powders, etc., and recommends the following formula for a compound elixir:

Acetanilid	320 grs.
Caffeine	32 "
Tinct. Nux Vomica	256 minims.
Spir. Ammonia Aromatica	8 fluidounces.
Purified Talcum (U. S. P.)	120 grs.
Aromatic Elixir (U. S. P.), a sufficient quantity to make	16 fluidounces.

Dissolve the acetanilid and caffeine in the aromatic spir. ammonia by agitation, then add the tinct. nux vomica and sufficient aromatic elixir to make sixteen fluidounces. Incorporate the purified talcum thoroughly with the mixture and filter. Dose, one teaspoonful every two or three hours in a wineglassful of water.

Elixir Digestivum Co.—Improved Formula.—Milton R. Dunn by some slight alternations of the N. F. formula for Compound Digestive Elixir has succeeded in constructing the following formula which has given good satisfaction and possesses greater digestive power than that made by the N. F. formula:

Pepsin, 1–3000	50.	Gm.
Rennin, 1–3000	4.	"
Taka Diastase	4.	"
Lactic Acid	2.	"
Hydrochloric Acid	.5	Cc.
Citric Acid	7.5	Gm.
Spirit Curacao	40.	Cc.
Orris Root, powdered	10.	Gm.
Sugar	750.	"
Tr. Cudbear	60.	Cc.
Glycerin	1000.	"
Alcohol	250.	"
Water—to make	4000.	"
Talc	40.	Gm.

Mix the Lactic aud Hydrochloric acids with 1000 Cc. or water, add Pepsin, Rennin and Diastase. Agitate until apparently dissolved. Mix the Spirit with Alcohol and add Citric acid and Orris root and 900 Cc. of water. Allow this to stand for twenty-four hours with occasional agitation. Mix the two solutions with the Talc and Tr. Cudbear. Filter through paper. In the filtrate dissolve the Sugar and add the Glycerine and sufficient water through the filter to make 4000 Cc.—The Apothecary, October, 1910, 18.

Elixir Digestivum Comp. N. F.—personal experience with it, is the subject of a paper by Henry C. Blair, in "Proceedings," 1910, 1266–1267.

Elixir of Iron, Quinine and Strychnine Phosphates—Improved Manipulation.—Richard J. Fritzinger makes some practical observations concerning the manipulation to secure a satisfactory product by the U. S. P. formula for elixir of iron, quinine and strychnine phosphate: Follow the process of the Pharmacopœia, with the exception of using the unfiltered instead of the filtered aromatic elixir, and permitting the mixed product to stand over night or for a longer period. Nor does the advantage of this method lie solely in the saving of alcohol by virtue of the more rapid filtration. No talcum is required as a clarifying agent; and, obviously, there will be a higher percentage of alcoholic strength in the finished product. The additional alcohol in the elixir exerts its solvent power upon the oils in the aromatic ingredients, thus aiding in the clarifying process and enabling a larger proportion of the oils to be held in solution. —Drugg. Circ., Dec., 1911, 685.

Elixir of Iron, Quinine and Strychnine Phosphate.—A satisfactory modification of the official formula is described by Adolph F. Marquier, in "Proceedings," 1910, 1260.

Essence of Pepsin, N. F.—Improved Formula and Change of Title.—Adolph F. Marquier considers the title "Essence of Pepsin" for the preparation so-called in the National Formulary inappropriate, and proposes that

Elixir Pepsini Compositus (Compound Elixir of Pepsin) shall be adopted as the proper title. Also, that the formula needs some trifling improvements which are embodied in the following formula which he has used satisfactorily for a number of years:

Pepsin (U. S. P.)	22.5	Gm.
Rennin	16.5	Gm.
Lactic acid	2.	Cc.
Oil sweet orange	1.	Cc.
Oil lemon	.3	Cc.
Oil cloves	.180	Cc.
Alcohol	100.0	Cc.
Sherry wine (palest obtainable)	125.0	Cc.
Glycerin	125.0	Cc.
Syrup	125.0	Cc.
Distilled water a sufficient quantity to make	1000.0	Cc.

—Proc. N. J. Pharm. Assoc., 1911, 95.

Elixirs of Rhubarb and of Senna, B. P. C.—Modification of Formulas. W. M. Cooper points out certain defects in the formulas and directions for preparing the B. P. C. Elixirs of Rhubarb, of Senna, and of Senna Pods, and suggests the following modifications by which their preparation is greatly accelerated and the product more satisfactory:

Elixir Rhei (*Suggested Modification*).

Liquid extract of rhubarb	25.00	5 fl. ozs.
Anethol	0.05	5 minims
Syrup	22.50	4½ fl. ozs
Glycerin	15.00	3 fl. ozs.
Distilled water to	100.00	to 20 fl. ozs.

Dissolve the oil in the liquid extract and add the other ingredients, allow to stand twenty-four hours and filter through kaolin.

Elixir Sennæ (*Suggested Modification*).

Tincture of capsicum	0.20	20 minims
Chloroform	0.25	25 minims
Alcohol	5.00	1 fl. oz.
Syrup of senna to	100.00	to 20 fl. ozs.

Dissolve the tincture and the chloroform in the alcohol and make up with syrup of senna to the required volume.

Elixir Sennæ Leguminorum (*Suggested Modification*).

Liquid extract of senna	50.00	10 ozs.
Refined sugar, in coarse powder	50.00	10 ozs.
Chloroform	0.25	25 minims
Oil of coriander	0.02	2 minims
Tincture of capsicum	0.20	20 minims
Distilled water to	100.00	to 20 fl. ozs.

Dissolve the chloroform, oil, and the tincture in the liquid extract, and dissolve the sugar in the product, then add distilled water to the required volume.—Pharm. Jour. and Pharmacist, Dec. 10, 1910, 698, 699.

Elixir Santal Co.—Simple Formula.—Milton R. Dunn recommends the following formula for preparing compound elixir of santal, which has met with favor. It is very palatable, and readily dissolves potassium and lithium salts, hexamethylenamine, etc.:

F. E. saw palmetto (34 per cent. alcohol)	250 Cc.
F. E. corn silk (15 per cent. alcohol)	250 "
Oil santal	7 "
Alcohol	360 "
Glycerin	380 "
Orange flower water	760 "
Talc	30 Gm.

Mix and allow to stand with occasional agitation for a week, then filter. —The Apothecary, October, 1910, 18.

EMPLASTRA.

Medicinal Plasters—Development of their Manufacture.—Frederick B. Kilmer very comprehensively reviews the history and development of plas-

ter manufacture, beginning with the earliest traditional accounts, from the priesthood of Isis down to the monks of the near past, who, with a remarkable knowledge of gums, juices and resins, appreciated the remedial value of plasters which were skilfully prepared therefrom; down to the colonial days when in our own country many a colonial quack gained his reputation on the supposed merits of his "wonderful healing plasters," and so to the legitimate and rational manufacture of plasters, which from the colonial days until about 1874 were made pharmacopœically mainly with the diachylon base, in sticks, rolls and spread plasters. In this industry the names of De La Cour, Wyeth, Maxwell, Shoemaker, Ellis, Skidmore, Shivers and Husband are familiar, De La Cour being evidently the pioneer of plaster manufacture in this country. Plasters with an India rubber base, had their origin about the year 1845, when Horace Bay and Dr. Shecut invented a combination of India rubber and the gums ordinarily used in the plaster mass for spreading the plasters which have modernly replaced the diachylon base of earlier times, and the evolution of India rubber plasters has now reached a point where it not only requires a large amount of machinery, but a vast amount of detail in every step, which only long experience and accurate judgment can give. Prominent among the names connected with rubber plaster making are Grovenor of Boston; Seabury, of New York; Johnson, of New Brunswick. Leaving out of consideration the difficulties encountered by these pioneers in the rubber-plaster manufacture, as described in Mr. Kilmer's paper, it may be said that rubber plaster masses to be acceptable must contain at least 33⅓ per cent. of rubber, the combination consisting mostly of 2 parts India rubber and 1 part Burgundy pitch, the remainder being made up by gum, olibanum, wax, sometimes olive oil, and fillers, such as orris root, to complete the mass. The actual processes, the author states, as outlined in the U. S. Dispensatory, are substantially correct. But the making of India rubber plasters is hardly within the province of a retail pharmacist. In fact it is an art which requires the installation of large and expensive apparatus.

In the U. S. P. viii an attempt has been made to produce by a revised formula a rubber-adhesive plaster, under the title of "Emplastrum Adhesivum," which was also intended as a base or vehicle for medicated plasters (belladonna, capsicum, opium, etc.), to enable the pharmacist to prepare and spread rubber base plasters. This expedient in Mr. Kilmers opinion proved a failure, if for no other reason, because the plaster mass contained only 2 per cent. of rubber instead of 33⅓ per cent. required for the manufacturers' product. Mr. Kilmer does not wish to discourage the preparation and spreading of plasters by the pharmacist, however: quite to the contrary, he would rather urge the addition of a still greater number for which there may be a reasonable demand; but he advises a revision of the pharmacopœial plaster formulas and particularly, that a mass or base more nearly resembling that of 1880 for "Emplastrum Ad-

hesivum be restored. Furthermore that, if such a course could be possible, the alternative use of any India rubber mass, such as now used by manufacturers, be allowed, by prescribing assay processes for all plasters containing alkaloids or other definite medicaments.—Amer. Journ. Pharm. Sept. 1910, 416–428.

Plasters—New formulas.—The following formulas for plasters are in use in the St. Louis Hospital in Paris, France. Two of these formulas require a caoutchouc base, designated as

"*Lanolini c. Caoutchouc,*" which is made by mixing a solution of 150 Gm. of caoutchouc in chloroform with 1650 Gm. of lanolin and distilling off the chloroform.

Emplastrum Zinci Oxydati (Portes).

Emplastrum simplicis	720
Ceræ flavæ	400
"Lanolini c. caoutchouc"	1800
Zinci oxidi	600

Emplastrum Pyrogalloli (Portes).

Ammoniaci	20
Ceræ flavæ	20
"Lanolini c. caoutchouc"	50
Colophonii	20
Terebinthinæ laricinæ	50
Pyrogalloli	126

Emplastrum Calomelanos (Quinquand and Portes).

Emplastrum simplicis	3000
Calomelanos	1000
Olei ricini	300

Emplastrum Olei Cadini (Quinquand and Portes).

Emplastrum simplicis	1000
Ceræ flavæ	500
Olei cadini	300

Emplastrum Olei Jecoris Aselli (Quinquand and Portes).

Emplastrum simplicis	3000
Ceræ flavæ	1250
Olei jecoris aselli	1750

Emplastrum Olei Gynocardiæ (Quinquand and Portes).

Emplastrum simplicis	2000
Ceræ flavæ	1000
Olei gynocardiæ	3000

Emplastrum Rubrum (Vidal).

Emplastrum simplicis	5200
Plumbi oxidi rub. (minium)	500
Hydrargyri sulphidi rub. (cinnabar)	300

Emplastrum Saponatum (Pick).

Emplastrum simplicis	70
Ceræ flavæ	10
Saponis medicati	5
Camphoræ	1
Olei olivæ	1

Mix the first two ingredients together and add to the others previously mixed in a mortar.—Pharm. Journ. and Pharmacist, October 28, 1911, 556; from Gazette Méd. de Paris, 1911.

Caoutchouc Plasters—New Formulas.—The "D. milit. Ztschr." (1910, No. 11) publishes the following formulas for rubber adhesive plasters:

Rubber Adhesive Plaster: Dammar, 40.0; rosin, 20.0; anhydrous woolfat, 140.0; caoutchouc, 100.0.

Rubber Zinc Plaster: Dammar, 50.0; rosin, 25.0; anhydrous woolfat, 150.0; caoutchouc, 100.0; zinc oxide, 80.0.—Pharm. Ztg., lv (1910), No. 55, 556; from N. D. Med. Wschr., 1910, No. 25.

Rubber Adhesive Plaster—Improved Formula.—After pointing out the defects of the U. S. P. formula and that of the B. P. Codex for rubber adhesive plaster, F. Goldly communicates the following modification of the latter which proves satisfactory:

India-rubber (masticated, cut in fine strips)	20
Copaiba balsam	6
Wool fat (anhydrous)	53
Powdered orris root	20
Methyl salicylate (by weight)	0.6
Thymol	0.4
Petroleum spirit, a sufficient quantity.	

Macerate the india-rubber with six times its weight of petroleum spirit until a homogeneous quasi-solution is formed. Melt together the wool fat and copaiba balsam and heat the mixture to 100° C. for ten minutes. When partly cooled stir in half the weight of the mixture of india-rubber and petroleum spirit, together with the thymol, methyl salicylate, and powdered orris root (previously dried). When quite cold mix thoroughly with the remaining rubber solution and strain, if necessary, by forcing through a double thickness of muslin.

The plaster mass is then ready for spreading on suitable material, without heat, and the spread plaster should be hung up in a room at ordinary temperature to dry. If the mass is required to be kept for any time be-

fore spreading it must obviously be stored in a well-stoppered vessel to avoid evaporation of the petroleum spirit.—Pharm. Journ. and Pharmacist, Dec. 10, 1910, 698.

EMULSA.

Emulsions—Comparative Value of Different Emulsifying Agents and their Selection.—P. B. Phillips observes that an emulsion in its widest sense includes any liquid preparation containing matter in suspension and not readily separable, but the term is usually restricted to fluid aqueous mixtures of oils and resins. The three types of emulsion met with at the dispensing-counter are: (1) Emulsification of oil by means of gum—*e. g.*, by mixing the oil with mucilage of acacia and then stirring in water carefully, the oil particles being prevented from uniting by being enveloped with a thin mucilaginous coat. (2) Emulsification of resinous tinctures or fluid extracts by pouring them into diluted mucilage. (3) Emulsification of oil or oleo-resin by means of alkali, the soap formed suspending the remaining oil or eleo-resin. The author describes the relative value of acacia, tragacanth, alkalies, egg-yolk, casein, etc., their advantages and disadvantages, about which there is much diversity of opinion, as there is about the particular emulsifying agents which are permissible. Acacia and tragacanth have no medicinal value except as demulcents, and it is generally agreed that there is no objection to their use as emulsifiers on the score of physiological action. Liq. potassæ is a caustic, and should not be used unless specially ordered, but the dispenser is justified is using egg-yolk. Saccharated casein should not be used unless so directed, as the prescription may be for a diabetic patient, but unsweetened condensed milk is permissible. Tr. quillaiæ and tr. senegæ should not be used unless ordered.—Chem. & Drug., Mar. 11, 1911, 94.

Creosotal Emulsion—Method of Making.—P. J. Minton recommends the following method of making a permanent emulsion of creosotal:—First rub the creosotal with an equal weight of powdered gum acacia, and and after thoroughly triturating add water drop by drop until the mixture turns milk-white. To this we can add water, syrup or aromatic elixir, in sufficient quantities. The result will be a perfectly white emulsion which will not separate on standing. Bull. Pharm., Sept. 1910, 384.

Emulsion of Cod-Liver Oil—Improved Formula.—O. Richter finds that the addition of glycerin in the formula for emulsion of cod-liver oil does not serve simply as a sweetening agent and preservative, but contributes more particularly to facilitate and maintain perfect emulsification. The process should be carried out as follows: Powdered acacia, 2.0 Gm., and powdered tragacanth, 3.0 Gm., are triturated with 50.0 Gm. of glycerin, gradually added, and this mixture is added to 150.0 Gm. of cod-liver oil, previously weighed into a 500-Cc. bottle. The bottle with contents is then vigorously shaken; then 120.0 Gm. of water, in which 4.0 Gm. of

calcium hypophosphite and 2.0 Gm. of sodium hypophosphite have previously been dissolved without heat, is added, and the mixture is again vigorously shaken. The flavoring ingredients, dissolved in alcohol, are then added. A perfect emulsion is thus obtained, which retains its homogeneity for a long time without separation. The success of the operation depends on the intimate admixture of the gums, first with the glycerin, then their mixture with the oil, before adding the water.—Pharm. Ztg., lvi (1911), No. 36, 363; from Südd. Apoth. Ztg.

Emulsion of Cod Liver Oil—Modification of the Formula.—The preceding article of Dr. Seel has given the incentive to a number of criticisms on the G. P. V formula for preparing emulsion of cod liver oil, which appears in several numbers of the "Pharmaceutische Zeitung"—some finding the preparation unstable, others that the process is defective, and still others that the official formula is satisfactory, both as regards the stability of the product and the manipulation. To illustrate how widely experimenters may differ in their methods of reaching satisfactory results in the preparation of this emulsion, the following recommendation of Mindes will serve as an example:

In a dry, lipped dish mix 0.25 of vanillin, 0.50 saccharin, 7.5 powdered tragacanth and 7.5 powdered acacia, with 50.0 glycerin; add to this mixture, in small portions at a time, a mixture of 50.0 cognac and 150.0 distilled water, and form a paste. Into a flask (of suitable capacity) weigh 400.0 cod liver oil, add 10 drops oil of peppermint, and pour this oil mixture, in small portions at a time, into the paste, triturating (working, sic.) to form a jelly. Now add (to this) in small portions a mixture of 50.0 orange-flower water and 300.0 distilled water and pour the entire mixture into the flask, which is then well shaken for 2–3 minutes.—Pharm. Ztg., lvi (1911), No. 45, 453.

Emulsion of Silver Iodide (So-called)—Improved Method of Preparation.—In his experiments with the object of obtaining a perfect suspension of *nascent* silver iodide, as suggested by Mr. M. I. Wilbert (see Proceedings, 1906, 853), John K. Thum used the yolk of fresh eggs with ideal results—the precipitate of the silver iodide, obtained by the reaction between potassium iodide and silver nitrate, being allowed to take place in the presence of the egg-yolk. By adhering to this method, the greater part of the silver iodide was kept in colloidal condition. In search of a cheaper vehicle, he has since experimented with various mucilaginous substances, with fair success, but recently conceived the idea of trying gelatin—a typical colloid. Aqueous solutions of a good quality of gelatin, ranging from 0.1 to 0.5 per cent., the solution of the gelatin being facilitated by warming. In these solutions the silver iodide was precipitated, after dissolving the KI by gradually adding the silver nitrate in small quantities, shaking well after each addition. Very curiously, the resulting precipitate

fell immediately to the bottom of the flask when the agitation was discontinued; but by shaking at frequent intervals during the next twenty-four or thirty-six hours, nearly the whole of the silver iodide was brought in almost perfect suspension, so that after standing a week only a very slight margin of liquor was formed at the top of the flask. It was not possible to separate the colloidal suspension from this liquid by filtration, because it passed through the filter. Evidently the action of the gelatin has the effect of reducing the silver iodide to a remarkable degree of fineness. The author finds a solution containing 0.3 per cent. of gelatin to be most efficient. The emulsion has the appearance of rich cows' milk and the slight precipitate at the bottom of the flask is readily suspended by gentle shaking.—Amer. Journ. Pharm., Nov. 1910, 507.

EXTRACTA.

Medicinal Extracts—Definition of Consistence on the Basis of Moisture-Content.—Kenneth C. Allen and Theodore Brewis deprecate the prevailing system of defining the consistence of solid extracts as soft, firm, thick, thin, pilular, or dry, as the case may be. The definition should be based on the weight of really dry extractive actually obtained. Definite limits of moisture should be prescribed, and the ash content should be mentioned. To illustrate the points made in their short note, the authors append figures for moisture and ash obtained by them in a series of pharmaceutical solid extracts, which may here be recorded for general information:

Extract.	Moisture, dried 100°–105° (per cent.).	Ash (per cent.).
Aloes barb.	6.74	1.63
Anthemidis	33.9	9.92
Belladonnæ alc.	23.7	3.01
Belladonnæ virid.	28.3	15.05
Cannabis ind.	10.5	0.24
Cascaræ sagradæ	13.32	5.54
Colchici	33.1	8.59
Colocynth. co.	14.81	4.97
Ergotæ	22.5	14.55
Euonymi sicc.	7.4	27.8
Gentianæ	27.1	4.22
Glycyrrhizæ	33.54	6.35
Hyoscyami virid.	25.89	17.57
Jalapæ	25.58	1.83
Krameriæ	10.34	3.29
Nucis vom.	22.13	2.69
Opii	22.16	3.6
Physostigmatis	9.51	1.27
Rhei	13.64	5.78
Stramonii	22.13	8.93
Strophanthi	4.89	0.08
Taraxaci	29.05	6.24

—Trans. Brit. Pharm. Conf. (Yearbook. of Pharmacy) 1911, 417–419.

Extracts—Alteration in Solubility on Keeping.—An examination by K. A. Jacobsen of the solubility of various extracts in alcohol and water before and after keeping showed considerable differences in the effects of age. Extracts of rhubarb, colocynth, and nux vomica showed no change in their solubilities in alcohol or water after being kept for six to eight months; extract of gentian became less soluble in strong alcohol, but showed no change in its solubility in dilute alcohol. Extracts of henbane and belladonna showed such differences that no general statement could be made in regard to them. The solubility of extract of rhubarb did not depend on the temperature at which it was kept.—Apoth. Ztg. xxvi (1911), No. 42, 422; from Arch. f. Pharm. og. Chem. Nos. 8 and 9, 117–120 and 145–149.—

Extracts of Belladonna and Hyoscyamus—Superiority of the Alcoholic Extract from the Dried Drugs.—The new German Pharmacopœia (V) having, in conformity with the "Protocol" adopted by the International Pharmaceutical Congress at Brussels, dismissed the extracts of belladonna and hyoscyamus prepared from the fresh plants, and replaced them with extracts prepared from the dried *leaves* of the plants by percolation with 70 per cent. alcohol, T. W. Danckwortt has made a series of experiments in order to ascertain the relative value of the two methods of preparation, as well as the advantage, if any, of using only the leaves instead of the whole herbaceous portion. Extracts were accordingly prepared from fresh herb and leaves by the process of the G. P. IV, and from the dried herb and leaves by process of percolation directed in the "Brussels Protocol", the material being of the identical harvest, and the resulting extracts adjusted so as to retain 15 per cent. water. Referring to the original paper for the details of their experiments, the results in the case of *belladonna* may be condensed as follows:

(1) The leaves contain less alkaloid than the entire herb.

(2) By percolation of the dried drug with 70 per cent. alcohol the yield of extract is not only larger, but the alkaloidal content is also greater than in the extract made from the fresh drug.

(3) The extract obtained by percolation from the dried herb contain more alkaloid than that obtained from the dried leaves, but the yield of extract from the leaves is greater.

(4) The international requirement that the extract shall retain only 10 per cent. of water should be changed to 15 per cent.

It is of practical interest that the yield of extract, containing 15 per cent. of water, when calculated for the fresh herb and leaves respectively, was as follows:

Herb: fresh, 1.88 per cent. (= 1.699 per cent. alkaloid); dried, 3.97 per cent. (= 1.917 per cent alkaloid).

Leaves: fresh, 2.02 per cent. (= 1.207 per cent. alkaloid); dried, 5.38 per cent. (= 1.282 per cent. alkaloid).

The actual yield from the dried material was: from herb, 31.30 per cent., from leaves, 29.88 per cent. If the chlorophyll is filtered out after distilling the alcohol from the percolate, these quantities are reduced to 26.6 per cent. and 25.55 per cent respectively, the percentage of alkaloid bring correspondingly increased.

Similar results were obtained with hyoscyamus leaves and herb, but these were confined to a single specimen each of the herb and dried leaves.—Arch. d. Pharm., *249* (1911), No. 4, 247–253.

Extracts of Belladonna and Hyoscyamus—New Method of Alkaloidal Assay.—A new and simple method for the estimation of alkaloid in the extracts of belladonna and hyoscyamus has been adopted in the laboratory of the Association "Pharmakon" of St. Petersburg, which may be briefly outlined as follows: The extract (using twice as much extr. hyoscyam. as belladon.) is liquefied with water and, after addition of ammonia, vigorously shaken with a measured quantity of ether. After subsidence, an aliquot of the ethereal extraction is evaporated, the residue is dissolved in alcohol, the solution diluted with water, a specified quantity of pure sodium chloride is added, followed by a measured quantity of $\frac{N}{10}$ hydrochloric acid, the whole being adjusted with water to a specified volume. An aliquot quantity of liquid is then filtered off, a measured quantity of ether is added, and the unconsumed hydrochloric acid is then ascertained by titration with $\frac{N}{10}$ potassium hydroxide, using iodeosin as indicator, to a faint rose color. The reaction is quite sharp, and the calculation is made in the well-known manner.—Pharm. Ztg., lvi (1911), No. 60, 604; from Farmaz. Journ. russ., 1911, 138.

Extract of Belladonna—Its Microscopical Examination—is the subject of a paper by E. N. Gathercoal, which appears in "Proceedings," 1910, 898–902.

Extract of Indian Hemp, B. P.—Comparison with the Non-official Commercial Extracts.—As pointed out by D. Hooper (see Proceedings, 1895, 573) the official (B. P.) extract of Indian hemp is composed of a mixture of a green resin and brown water-soluble extractive matter. Merson (1904) showed that this brown extract was not readily soluble in alcohol, and that commercial extracts varied largely in the proportion of this substance they contain. Harold Dean has now made a series of experiments, the results of which are exhibited in three tables; one, based on the examination of various samples of Indian hemp, indicating the proportions in which the two components may be expected in the extract; the other two showing the results of the examination of commercial samples of the extract. The results obtained fully bear out the numerous criticisms that have been made as to the variability of this extract as supplied by manufacturers. Nevertheless, the non-official extracts are preferred to the official, their predominance being due to the fact that the

pharmacopœial preparation is unsatisfactory, being composed of two constituents, the resin and the brown extractive, which show a tendency to separate, and, moreover, is incompletely soluble in alcohol, which makes the preparation of the tincture troublesome and messy. Therefore a demand has arisen for an extract soluble in alcohol, and there is a general idea that the B. P. extract ought to be soluble in alcohol. Such an extract can be obtained by the simple method of washing away the brown extractive with warm water, after the spirit has been distilled off, there being little doubt that the resinous portion of the extract contains the active principle. No doubt this is the method by which most of the soluble commercial samples mentioned in the table were obtained, and the author urges that this method be adopted in the B. P.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 402–406.

Kola Extract—Experiments on the Process of the Fr. Phar.—In continuation of previous experiments, employing various kinds of kola nuts of the market, J. Warin and F. Grand find that the official process actually extracts 95.75 per cent. of the total caffeine present in the drug; and that using half as much more menstruum, only another 1.8 per cent. of the whole is extracted. But the finished extracts, even when prepared from powdered kola nuts much richer in caffeine than the official requirements, containing 1.8 per cent., instead of 1.25 per cent., will never yield an extract containing 10 per cent. of caffeine as required; since the amount of extractive accompanying the alkaloid is so great that it reduces the alkaloidal value of the finished product to 6.8 and even 4.8 per cent. In fact, 5 per cent. of caffeine, or half the amount officially required, is rarely got. It is suggested that the caffeine may be present in the nuts in two forms, one more soluble in the menstruum than the other. Even in the preparations made without filtration, which has previously been shown to remove a considerable amount of alkaloid, the total alkaloid present does not represent the whole present in the powder. This may be partly due to experimental loss, or to the fact that the caffeine enclosed in the resinous precipitate is less easily separated than that from the filtered product. The authors have tried the effect of adding one molecular weight of hydrochloric acid for each molecule of caffeine present in the powder. This expedient had the apparent effect of increasing the richness of the resulting extract in caffeine. But this was due to the markedly lower quantity of extractive yielded, 11.2 per cent. compared with 15 per cent.—Pharm. Journ. and Pharmacist, Dec. 17, 1910, 729: from Journ. de Pharm. et Chim., 1910, *2*, 350.

Extract of Kola—Suggestions Regarding its Preparation.—Boulanger and Dausse find that both the material employed and the method of manipulation affect the quality of kola extract. An extract made to contain about 10 per cent. of caffeine made from the dried commercial drug

with two cotyledons, *Kola acuminata*, is crumbly and of indifferent consistence. In order to obtain the full alkaloidal strength the concentrated extract must not be filtered. An extract made to contain 5 per cent. of caffeine, prepared from the dried commercial drug with four cotyledons, *Kola ballayi*, has a good consistence, and is a satisfactory preparation. The extract obtained from fresh kola nuts, with two cotyledons, sterilized with boiling alcohol, contains 5 per cent. of caffeine. Kola nuts sterilized by steam and powdered yield an extract containing 7 to 10 per cent. of caffeine. The two last-named extracts are elegant preparations, and much superior to that obtained from the commercial dry drug, but they are more costly. The best material to use is the steam-sterilized powdered drug.—Pharm. Journ. and Pharmacist, Mar. 25, 1911, 399; from Bull. Sci. Pharm., *17* (1910), 639.

Extract of Licorice—Commercial Assay.—Evans Sons, Lescher & Webb publish the following simple method for the commercial assay of licorice: 2.5 Gm. of the sample are dissolved in 15 Cc. of water in a beaker by the aid of heat. When cool, 23 Cc. of alcohol and 2 Cc. of water are incorporated; then 50 Cc. more of alcohol are added and the mixture allowed to stand half an hour. The precipitate, consisting of starch and gum, is collected on a tared filter and washed with a mixture of 50 Cc. alcohol and 4 Cc. water. The filtrate and washings are evaporated on a water-bath to syrupy consistence, then transferred into a thin-walled cylindrical glass vessel by the aid of 30 Cc. of water, and the vessel is cooled in melting ice; 3 Cc. of diluted sulphuric acid (1 : 30) are then added, and the cylinder is placed into a freezing mixture of salt and ice. In this way, on the subsequent slow melting of the mixture, the glycyrrhizin is obtained in form of a solid mass adhering to the bottom of the glass cylinder. The supernatant liquid being carefully decanted, the glycyrrhizin is washed by decantation with 50 Cc. of water at 0° C., and when this has been decanted as far as possible, 2 Cc. of ammonia water are added and the glycyrrhizin tranferred with absolute alcohol into a tared crucible, in which it is evaporated and dried at 100° C. to constant weight.—Pharm. Ztg., lvi (1911), No. 72, 723; from Chem. Ztg., 1911, No. 92.

Extracts of Malt—Valuation.—Dr. E. Seel discusses the demands that should be made in order to properly determine the value of malt extracts, which are usually confined to the physical character of the preparation, such as color, consistence, odor and taste. The color depending on the kind of malt used for their preparation, these extracts are differentiated as light and dark in accordance with the color of the malt employed; but this is not a safe criterion, since the color is liable to vary also according to the method and care in manufacture. The consistence of a properly made extract of malt should be thick syrupy, depending on a content of about 25 per cent. of water, and the odor

should be agreeably aromatic, malt-like. The merely physical characters are however liable to be misleading, and must be substantiated by a knowledge of the chemical character of the preparation. It may be of good consistence and yet be deficient in maltose (of which it should contain about 55 per cent.) with corresponding excess of dextrin, while diastase, nitrogenous bodies (particularly albuminoids) and mineral substances are important constituents which must be taken into account. Of the nitrogenous bodies in malt extracts the albumoses and the phosphorus-containing nucleo proteids, which are rendered soluble by the peptases of the malt, are the most important constituents on account of their ready assimilability. These should be present to the amount of from 4 to 6 per cent. The acid contents, lactic acid, should be insignificant (only a few per mille). Of the mineral constituents, the readily assimilable phosphorus and iron compounds are also of therapeutic importance, and should not be neglected in a chemical valuation of malt preparation.—Pharm. Ztg., lvi (1911), No. 27, 273: from Med. Klin., 1911, No. 12.

FLUIDEXTRACTA.

Fluidextracts—Experiments on Repercolation.—H. V. Arny and E. M. Oxley during three consecutive winters conducted a series of experiments on repercolation and obtained some noteworthy results which they now communicate. Using the same stock of gentian, selected groups of students were allotted the manufacture of 200 Cc. of fluidextract by repercolation, 43 samples being thus obtained during the three years prepared by different individuals. From the same batch of gentian a fluidextract was prepared each year by percolation with partial evaporation, care being taken to secure complete exhaustion of the drug, and the dry extract determined in 10 Cc. of the preparation for comparison with the products obtained by repercolation. Three series were thus established with results shown in tables, from which it becomes evident the amount of extract in all but three samples of fluidextract obtained by repercolation runs considerably below that made by percolation with partial evaporation the difference amounting on an average to about 25 per cent. The authors conclude that under the care exercised by the average manipulator, a 100 per cent preparation is not obtainable, and this emphasizes the need of some sort of standardization whether the operation is large or small.

The authors, furthermore, record some experiments by which they show that the first 500 Cc. of percolate from 1000 Gm. of drug yields a considerably larger quantity of extract per cubic centimeter than is contained in a cubic centimeter of fluidextract obtained by completely exhausting the drug. They suggest that by sacrificing one-half the drug, a percolate (500 Cc. from 1000 Gm.) is so obtained which might be adjusted by dilu-

tion to the strength of a normal fluidextract.—Merck's Rep., April, 1911, 97, 98.

Fluidextracts containing Alkaloids have been subjected to re-assay after varying intervals to ascertain their stability, and with few exceptions have been found to keep well, by A. R. L. Dohme and H. Engelhardt, whose paper appears in "Proceedings," 1910, 872, 873.

A paper on the same subject, including alkaloidal tinctures, by Wilbur L. Scoville, shows that with comparatively few exceptions, the sixty preparations examined have kept entirely satisfactory.—*Ibid.*, 874–883.

Aromatic Fluid-Extract of Cascara Sagrada—New Formula and Process.—Introducing the subject of an improved formula for making an aromatic fluidextract of cascara sagrada, R. C. Cowley observes that the physiological activity of glucoside containing drugs does not depend always on the glucosides they contain, but on the products of hydrolysis of the glucosides, and that this possibly explains the increased activity of cascara sagrada by aging the bark. From the experience of others, and more particularly from that recorded by White and Robinson in 1902 (see Proceedings 1903, 801), the author assumed the presence of a fermentable glucoside in cascara sagrada, and that the activity of this drug is at least in part due to the products of its decomposition. He had, moreover, found by digesting the powdered bark with water and a small proportion of emulsin that the percolates required a much larger proportion of ammonia for neutralization than when the drug was exhausted by water alone; and, furthermore, that when alkalinity was maintained during evaporation, the extract was free from the bitterness of cascara sagrada, and it still maintained its activity. He therefore conceived the idea of effecting the hydrolysis of the glucosides of the bark by preliminary treatment with acid and water, the experiment resulting in the adoption of the following method for preparing an aromatic fluidextract:

Cascara sagrada (No. 20 powder)	20 oz.	100.00
Diluted sulphuric acid	1 fl. oz.	5.00
Alcohol (90 per cent.)	4 fl. oz.	20.00
Oil of coriander	20 minims	0.21
Oil of orange	20 minims	0.21
Spirit of chloroform	80 minims	0.84
Gluside (soluble)	13 grains	0.15
Liquid extract of liquorice	4 fl. oz.	20.00
Solution of ammonia, Distilled water	of each a sufficient quantity.	

Boil the cascara sagrada with 7½ pints (750) of distilled water and the diluted sulphuric acid for two hours; allow the mixture to stand for twenty-four hours, then pack in a percolator and percolate with distilled water until the cascara bark is exhausted. Neutralize the percolate with

solution of ammonia, and evaporate on a water-bath to 12 fluid ounces (60), maintaining slight alkalinity throughout the operation by the further addition of solution of ammonia from time to time. Dissolve the oils and gluside in the alcohol, and the spirit of chloroform and the liquid extract of liquorice. Mix this with the concentrated solution of cascara bark, and, if necessary, make up to 20 fluid ounces (100) with distilled water. The product is very elegant and possesses undoubted activity.—Chem. & Drug., July 22, 1911, 46.

Bitterless Fluidextract of Cascara Sagrada—Preparation.—Dr. B. Borner recommends the following process for preparing a bitterless fluidextract of cascara sagrada, which may be advantageously used also for the preparation of the *solid extract* and for making *fluidextract of frangula* bark and other rhamnus preparations: 1000 p. cascara bark and 35 p. lime which has just been slaked, are mixed and extracted repeatedly with distilled water on a steam-bath, until the bark is completely exhausted. The united extractions are then evaporated to 5000 p., and while hot neutralized with citric acid. It is allowed to cool, again heated on the steam-bath for 25 minutes, strained at about 100° C., evaporated to 700 parts, and mixed with 150 parts each of glycerin and alcohol, to make 1000 parts. So obtained the fluidextract is faintly bitter and has a red-brown color. Before dispensing, 12 p. of "Mixtura aromatica composita" (which see under "Mistura") and 0.8 p. of saccharin (90 per cent.) are added to 1000 parts of the fluidextract. If, before adding the glycerin and alcohol the aqueous extraction is evaporated to dryness, about 28 per cent. of

Bitterless Extract of Cascara Sagrada is obtained. This, although somewhat hygroscopic, serves well for making "compressed tablets." A little fat-free cacao powder being added before compression.

Wine of Cascara Sagrada may advantageously be made from the fluidextract obtained as above by the following formula: Fluidextract of cascara sagrada, 1500 p.; sherry wine, 2400 p.; simple syrup, 150.; "Mistura Aromatica Composita," 20 p.—Apoth. Ztg., xxv (1910) No. 64, 591.

Fluidextract of Cinchona, U. S. P.—Nature of Crystalline Deposit.—The crystalline deposit which forms in the fluidextract of cinchona, U. S. P., prepared by extracting the bark by percolation with a mixture of alcohol, glycerin, and water, is shown by Javillier and Guerilhault to be calcium quinate, and to be free from alkaloids.—Pharm. Journ. and Pharmacist, June 3, 1911, 741: from Bull. Sci. Pharm. *18*, 1911, 93.

Fluidextract of Echinacea—Menstruum most Suitable.—George M. Beringer, in the absence of definite knowledge of the active constituents of echinacea root, considers it probable that the activity of the drug, if any, is possessed by the aromatic principles present in it, basing his opinion on the characteristic aromatic, sharp and pungent taste. It leaves a warm tingling sensation and a slight blistering effect on the mucous

surfaces of the lips, and this pungency and blistering effect is even more pronounced in alcoholic or hydro-alcoholic extracts. Experiments undertaken to determine a suitable menstruum for preparing a fluidextract lead him to the conclusion that a menstruum weaker than alcohol 2 volume, water 1 volume, will not extract the drug, and that even this is not quite satisfactory. A menstruum of 3 volumes of alcohol and 1 volume of water is a decided improvement, but the best result in his judgment will be obtained with a menstruum of alcohol, 4 volumes and water 1 volume, which he accordingly recommends for this fluidextract.—Amer. Journ. Pharm. July, 1911, 324.

Liquid Extract of Ergot—Improved Method of Preparation.—J. H. Franklin directs attention to the fact that the British Pharmacopœia stands almost alone in the use of an aqueous solvent for extracting the ergot in the preparation of the liquid extract of ergot, and that heretofore very little research work has been done to remedy some of the deficiencies of this preparation and to produce an ergot preparation that is therapeutically satisfactory. After numerous failures to produce a satisfactory aqueous liquid extract of ergot, he has found that the introduction of about 35 per cent. alcohol will produce a product of much greater potency, and he recommends as a suitable process to exhaust the ergot in coarse powder with 35 per cent. alcohol, as in the formula for liquid extract of hamamelis, B. P. A liquid extract of ergot prepared in this way was submitted by the author to Dr. G. S. Haynes, of the Pharmacological Laboratory, Cambridge, along with liquid extracts prepared respectively with 20, 50, 70 and 90 per cent alcohol, and also the liquid extract prepared by the B. P. method. The pharmacological results obtained by Dr. Haynes confirm the clinical results which had been reported to the author from time to time, and lead him to recommend menstrua of 25 to 35 per cent. as yielding a more reliable and more active liquid extract from ergot than can be obtained by closely following the B. P. process.—Trans. Brit. Pharm. Conf., (Year-book of Pharmacy), 1910, 430–435.

Liquid Extract of Ergot—Influence of Temperature on Extraction of the Drug.—Having at his command a supply of the last new season's ergot (best Spanish), Ernest Quant took the opportunity of determining whether any difference would result in using cold or warm water for exhausting the drug. Two pounds of ergot were taken, crushed, and the B. P. directions strictly carried out, using for one portion cold water, and for the other water at 100° F.; a temperature ranging between 80–100° F. was maintained for the first digestion, this infusion then being drawn off. The second digestion was commenced at 100° F., but not maintained. The following are the results of the products which were yielded:

Cold Maceration.		*Digestion,* 80–100° F.	
Specific gravity ...	1.011.	Specific gravity ...	1.038.
Dry extract	11.2 per cent.	Dry extract	15.1 per cent.

It will be at once apparent that there is a very distinct gain in maintaining the temperature during infusion. The author is aware that these results do not prove superior physiological activity; but he makes the point whether, in absence of proof to the contrary, the preparation containing the larger amount of extractive should not be regarded as the superior.—Pharm. Journ. and Pharmacist, Mar. 11, 1911, 331.

Fluidextract of Ergot—Keeping Quality.— Prof. Horatio C. Wood, Jr., directs attention to the comparatively rapid deterioration of ergot and the fluidextract, which in his opinion makes it unsafe to use ergot or its fluidextract after standing more than six months under ordinary conditions of care in keeping, and that under any conditions the fluidextract should not be kept more than a year. Experiments made by Dr. Hofer and himself convinced them of the reliability of a process of chemical assay described by them recently (see Proceedings, 1909, 151), and this was applied to the examination of the same fluidextract, kept in open (cotton stopped), corked, and sealed bottles, and the average loss per week of sphacelotoxin determined during a period of 5–15 and 16–25 weeks. The results showed rapid loss of sphacelotoxin, and these were confirmed by physiological test made, the loss of activity as measured by its power to raise the blood-pressure occurring more or less harmoniously with the figures obtained by the chemical assay. But, in view of the fact that there is still much difference of opinion as to the best methods of testing the activity of ergot, and that the value of the chemical method, which is the only one available for the purposes of the pharmacist, has not yet been confirmed by other observers, Dr. Wood would vigorously urge:—"(1) that the fluidextract of ergot be marketed by wholesalers in packages of not over four fluidounces, and *immediately after the completion of the percolation;* (2) that each bottle carry plainly upon the label the date of its manufacture; (3) that no pharmacist be permitted to dispense a fluidextract of ergot which is more than six months old."—Amer. Journ. Pharm., April, 1911, 172–175.

Fluidextract of Ergot has been subjected by Dr. Horatio C. Wood. Jr., to both physiological and chemical assay methods under varying conditions of preservation and at stated intervals, with results showing a deterioration of from 45 to 50 per cent. within a year's time. The paper appears in "Proceedings", 1910, 883–886.

Fluidextract of Hydrastis—Hydrastine content of German Commercial Samples.—The variation in German price list to the amount of 40 per cent. induced the "Bellevue Pharmacy" (Berlin) to determine the hydrastine content in five samples of different manufacturers. The percentages found ranged from 0.2026 to 0.2889, proving all them to contain more than the amount of hydrastine (0.2 per cent.) required by the Pharm. Germ.—Pharm. Ztg. lv (1910), No. 100, 1011.

Fluidextrat of Rhubarb—Advantageous Use of Soda in the Menstruum.—Garino Garibaldi's experiments demonstrate the utility of soda for the extraction of rhubarb in making the fluidextract. He used as menstrua: (1) 80 per cent. alcohol containing 1 per cent. of soda and (2) equal parts of 95 per cent. alcohol and water, containing 4 per cent. of soda—percentage of soda (NaOH ?) being calculated on the weight of drug used—10 per cent. of glycerin being added, also calculated on the weight of drug, before concentrating the extraction by evaporation. The fluidextract obtained with 85 per cent. alcohol had the sp. gr. 1.075 at 15° C., yielded 34.4 per cent. residue on evaporation, and contained 1 per cent. of chrysophanic acid and 6.35 per cent. of rheotannin and rheic acid. The figure obtained with fluidextract prepared with equal parts of water and 95 per cent. alcohol were: sp. gr. 1.108; residue of evaporation, 36 per cent.; chrysophanic acid, 1 per cent.; rheotannin and rheic acid, 6.35 per cent.—Pharm. Ztg. lv (1910) No. 72, 724.

INFUSA ET DECOCTA.

Infusa, Pharm. Germ. V—General Directions.—The general directions for preparing infusions have been modified in the Pharm. Germ. V, so as to require straining *with expression* instead of simple straining, and provide that, with the single exception of compound infusion of senna, the infusions must be prepared fresh when prescribed. This latter requirement is criticized as being too stringent in practice, since during epidemics, such as influenza, winter colds, etc., the demand is so frequent for certain of these medicaments as to make it difficult to comply with it. The critic suggests that this requirement might well have been modified so as to permit the alternative of dispensing infusions that have been prepared within a period of 48 hours, so that pharmacists may be able to supply a demand that may without such provision force him to violate the letter of the law.—Pharm. Ztg., lvi (1911), No. 29, 293.

Concentrated Infusions—Comparison with Fresh Infusions.—Referring to a recent discussion at an evening meeting of the British Pharmaceutical Society, in the course of which it was contended that, while most pharmacists admit the propriety of employing fresh infusions, the dictates of convenience, as a rule, compel the use of concentrated preparations, Thomas Stephenson observes that any conscientious pharmacist who has once made a fresh infusion *and observed its characters* will never again use the concentrated article. The two kinds of infusion differ entirely from one another in color, in specific gravity, and in behavior with other substances. In order to present the matter in a concrete form, nine typical infusions were prepared—(a) fresh, according to the B. P., and (b) by diluting concentrated (1–7) infusions obtained from reliable wholesale sources. The differences are shown in the following table:

INFUSION MADE.

According to B. P. —— From Concentrated (1:7).

Name of Infusion.	Color.	Specific gravity.	Extractive per cent.	Color.	Specific gravity.	Extractive per cent.
Aurantii	Pale yellow	1.006	1.21	Dark brown	1.002	1.32
Buchu	Pale yellow	1.002	0.56	Brown yellow	0.999	0.64
Calumbæ	Pale yellow	1.004	0.68	Brown-yellow	0.998	0.42
Cascarilæ	Brown-yellow	1.002	0.43	Brown	0.997	0.23
Digitalis	Green-yellow	1.004	0.34	Green-brown	0.997	0.21
Cinchon. Acid	Yellow-brown	1.004	0.70	Darker tint	1.002	1.4
Gentian. Comp	Pale yellow	1.002	0.53	Brown-yellow	0.998	0.51
Quassiæ	White	1.000	0.107	Pale Yellow	0.996	0 05
Rosæ Acid	Bright red	1.005	1.05	Red to brown	0.999 to 1.005	—

The most striking difference between the two classes of infusion is that of color. Infusions made by dilution are invariably darker, sometimes slightly, at other times markedly so. The specific gravity of these is also remarkable in that they are all lighter than fresh infusions—in most cases *lighter even than water*. This is due, doubtless, to their alcohol content. The percentage of extractive also shows considerable variation, and proves that a different process of exhaustion results in a product differing more or less in composition.—Pharm. Journ. and Pharmacist, Feb. 25, 1911, 255.

Decoction of Barley—Discoloration when Prepared with Ordinary Water.—P. Vierhout has observed that a decoction of barley, which was colorless when prepared with distilled water, had a reddish-brown color when prepared with ordinary (well- or tap-water). He found the discoloration to be due to the presence of a trace of iron in the ordinary water, reacting with the tannin of the barley.—Apoth. Ztg., xxv (1910), 476; from Pharm. Weekbl., *25* (1910).

Infusion of Digitalis—Improved Formula.—Prof. Philemon E. Hommel has found that a fine aromatic flavor can be imparted to infusion of digitalis by employing an aromatic water combining the oils of cinnamon, nutmeg, coriander and caraway; this combination is superior to cinnamon water, as it imparts a blended aroma instead of a distinctive taste not always desirable. The addition of a small amount of glycerin and a larger amount of the aromatic water are regarded as desirable improvements. The improved formula is as follows:

Digitalis leaves, bruised	15 Gm.
Alcohol	100 Cc.
Glycerin	50 Cc.
Boiling water	500 Cc.
Aromatic water (prepared as below), sufficient to make	1000 Cc.

The manipulation (presumably) is as usual.

Aromatic Water for Infusion of Digitalis: Oil of cinnamon, oil of nutmeg, oil of coriander, oil of caraway, of each, 0.50 Cc.; purified talc, 15 Gm.; distilled water, sufficient to make 1000 Cc.—Merck's Rep., June, 1911, 154.

LINIMENTS.

U. S. P. and N. F. Liniments.—A comparison with the liniments of the foreign Pharmacopœias is made by Otto Raubenheimer in a paper which appears in "Proceedings," 1910, 1226–1232.

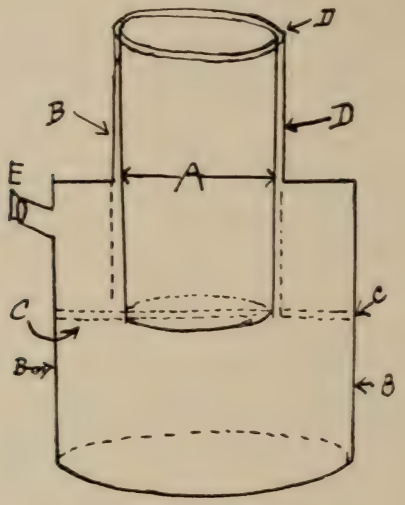
Linimentum Ammoniæ B. P.—Modification of Formula.—F. H. Alcock, after reviewing the many suggestions which have been made to prepare a perfect ammonia liniment, suggests, as the result of experiments, that the best preparation is obtained by leaving out as much of the water as possible, and recommends the following formula: Almond oil, 3 ozs.; olive oil, 8 ozs.; strong solution of ammonia (0.880 of commerce), 1 oz. Olive oil alone may be used if preferred. The product, however, still requires a "Shake-the-bottle" label. Trans. Br. Pharm. Conf. (Yearbook of Pharmacy), 1911, 415–417.

Chloroform of Belladonna, B. P.—Extemporaneous Process.—Ernest Quant suggests the following formula for the extemporaneous preparation of chloroform of belladonna, B. P.: Into a dry bottle place 1 fl. oz. liquid extract of belladonna, 1½ fl. ozs. chloroform and 4 grains heavy calcined magnesia; shake; then add 3 drachms dried sodium sulphate; shake frequently during 10 minutes, and filter. To the filtrate add 1 drachm more of dried sodium sulphate, agitate as before and filter; then add sufficient chloroform to the filtrate to make 2 fl. ozs.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1910, 445–447.

Linimentum Camphoræ—Preparation by Circulatory Displacement.—Frank E. Ernst describes the apparatus, shown in the accompanying sketch (Fig. 58), which he has used with satisfaction in preparing liniment of camphor by circulatory displacement. The apparatus consists of an outer vessel, *B*, from which a neck extends upward for the reception of the inner vessel, *A*, open at top with perforated sides and base, the latter resting on a horizontal flange, C, soldered to the inner side of *B*—the vessel *A* being removable, while the cover, *D*, serves for closing the opening of both *A* and *B*. The "modus operandi" is quite simple: Tare the apparatus and pour into it enough oil to immerse the flange *C* about half an inch; then introduce the necessary quantity of camphor into the vessel

A, place it in the vessel *B*, cover it with the cover *D*, and set the whole aside for two or three days at the ordinary temperature. When the camphor is completely dissolved, the liniment is finished without loss of camphor.—The Apothecary, Nov., 1911, 18 (–26).

FIG. 58.



Circulatory Apparatus.

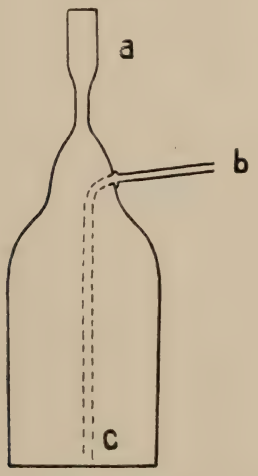
Soap Liniment—Quick Method of Preparing.—E. H. Rouse recommends the following method of dissolving the soap: Finely shave 2 ozs. of pure bar castile soap (instead of using granulated soap as directed in the U. S. P.), add 6½ ozs. of cold water, and dissolve by agitation in a bottle, adding a few drops of alcohol every minute or two to keep down the suds, and using in all about 2 ozs.; by this time the soap is all dissolved and the work is done much quicker than by the U. S. P. method. The remainder of a pint of alcohol is then added, followed by a solution of the camphor and oil of rosemary in 7 ounces and 1 drachm of alcohol. Finally add enough water to make 32 ounces, set the mixture aside 24 hours, and filter. —Bull. Pharm., December, 1910, 515.

LIQUORES.

Sterilized Solutions—Method and Apparatus for Rapid Filling in Ampuls.—J. Keseling and H. Serger contribute an interesting article on the preparation of stable sterilized solutions and give a description of the apparatus employed by them (shown in excellent photoengravings) for rapidly and automatically filling the solutions into ampuls. This paper will be consulted with advantage in the original by pharmacists who have occasion to supply sterilized solutions in ampuls to the trade.—Pharm. Ztg., lvi (1911), No. 46, 463–464.

Physiological Salt Solution—Sterilizing Flask.—Dr. C. Hof (Heidelberg) has constructed the sterilizing flask for physiological salt solution illustrated by Fig. 59. After filling the flask through *a*, this, as well as the open end of the bent tube, *b*, *c*, is closed with a plug of cotton, and the flask is then subjected to sterilization in the usual way. In use the flask is placed in warm water until the solution has acquired the desired tempera-

FIG. 59.



Sterilizing Flask.

ture, the plug of cotton is removed and replaced by a perforated stopper, which is attached to a sterilized rubber tube leading to the trocar—the outflow at *a* being established by inverting the flask and removing the cotton plug at *b*.—Pharm. Ztg., lvi (1911), No. 15, 149.

Sterilized Injections—Practical Observations.—M. Lesure makes some practical suggestions concerning the sterilization of injection fluids, which is most rationally accomplished in the autoclave, except in case of substances that are decomposed at temperature above 100°, in which event a water bath or some special means must be employed. He enumerates the following substances suitable for sterilization in the autoclave : Most of the inorganic salts (of mercuric salts the chlorides, bromides, iodides, cyanides), the salts of quinine, caffeine, phenol, sugar solution, most fixed oils, and if alkali-free glass is employed, even cocaine hydrochloride, as well as stovaine, arecolin, and atropine solutions, while in the case of morphine solution the opinion is divided. The author recommends the introduction of a chapter on sterilization, particularly in the autoclave, into the French pharmacopoeia.—Pharm. Ztg. lvi (1911), No. 19, 194; from Jour. de Pharm. et Chim. 1911, No. 2 and 3.

Liquor Aluminii Acetici—Reliable Formula.—The extraordinary num-

ber of criticisms and suggestions for the correction of the Phar. Germ. IV formula for liquor aluminii acetici make it very evident that some radical change must be made in this formula to render it satisfactory. Feist and Hochstätter, after a critical review of the different improvements that have been suggested, attribute the principal trouble to the use of calcium carbonate directed, which on the one hand is insufficient to decompose all the aluminium sulphate, and on the other, if an excess is directed, introduces calcium acetate as impurity. The suggestion of Bruns to preliminarily prepare aluminium hydroxide and to dissolve this in acetic acid in order to obtain a pure solution containing only tribasic aluminium acetate, is too complicated to be of service; but the authors find in the suggestion of Glücksmann, to use barium carbonate instead of calcium carbonate, a solution of the question of its satisfactory preparation. They have, therefore, constructed and recommend the following modification of Glückmann's formula, in which they, however, use aluminium sulphate instead of alum directed by the latter: 30.0 aluminium sulphate are dissolved in 80.0 water, and the solution is gradually mixed with a triturate of 26.0 barium carbonate and 20.0 water with constant stirring. Then 36.0 diluted acetic acid * are added in the same way, the mixture being placed in a cool locality and stirred occasionally during 8 days. It is allowed to settle and the clear liquid decanted, which must then be adjusted to the proper specific gravity by dilution with water. The product, like that prepared by the process now official, contains a small quantity of unconverted aluminium sulphate, but is free from all other impurities, and possesses indefinite stability.—Arch. d. Pharm., *248* (1910), No. 7, 525–528.

Solution of Bismuth and Ammonium Citrate—A Reliable Formula.—The formula of the B. P. 1898 for solution of bismuth and ammonium citrate having been found unsatisfactory, R. C. Cowley and the late J. P. Catford (in 1899) published the following modified formula, which Mr. Cowley recommends as being until now the most satisfactory that has appeared:

Bismuth oxynitrate	70	Gm.
Citric acid	50	Gm.
Potassium bicarbonate	103	Gm.
or		
Sodium bicarbonate	86.5	Gm.
Nitric acid (s. g. 1.42)	50	Cc.
Solution of ammonia (10 per cent.)	60	Cc.
Distilled water, a sufficient quantity.		

Dissolve the bismuth oxynitrate in the nitric acid diluted with an equal

* The "Diluted Acetic Acid" of the Phar. Germ. IV, containing 30 per cent. of absolute acetic acid, corresponds nearly to acetic acid U. S. P., which contains 36 per cent.—Rep.

volume of distilled water, warming gently until solution is effected; then dissolve the citric acid in a little water, and neutralize by the addition of about two-thirds of the potassium or sodium bicarbonate. When effervescence has ceased, add the liquid to the solution of bismuth nitrate; then add the remainder of the potassium or sodium bicarbonate mixed with a little water, stir well, dilute with hot distilled water to about a liter, cool, and filter. Wash the precipitate with distilled water until free from nitrates, and dissolve it by adding the solution of ammonia, diluted with sufficient distilled water to make 200 Cc., returning the ammoniacal solution to the filter until solution is complete. Finally, add sufficient distilled water to produce one liter, or to make a solution of specific gravity 1.07.

This formula, Mr. Cowley says, requires very little alteration. Before filtering off the precipitate of bismuth citrate, the liquid should be diluted to at least four times the volume of the final product. It is important that the solution of ammonia should be free from pyridine and other tar compounds, or it will develop a fungoid growth very soon.—Pharm. Journ. and Pharmacist, Feb. 4, 1911, 131.

Standard Caramel Solution—Convenient Method of Preparation.—Geo. A. Menge suggests the following formula and process for preparing a standard solution of caramel, such as is now before the committee on the National Formulary for adjusting the tinctorial power of tincture of caramel: Make a sulphuric acid solution by adding 1 Cc. of pure concentrated sulphuric acid (sp. gr. 1.84) to 12 Cc. of water. Take 0.5 Gm. of sugar in a test-tube, add 5 Cc. of the acid solution described, and heat the mixture in a boiling water-bath, with mixture continuously submerged and with constant agitation, for exactly five minutes. Immediately add a little cold water and then 35 Cc. of the U. S. P. test solution of potassium hydroxide; finally dilute to 100 Cc. The whole procedure takes 15 minutes and gives correlating results that very closely approximate to those obtained by the method now before the committee, which the author considers practically impossible from the pharmacist's point of view.—Amer. Journ. Pharm., March, 1911, 113, 114.

Referring to Dr. Menge's proposed preparation of a "Standard Caramel Solution," F. A. Upsher Smith states that he has for several years used a standard for comparison that is more readily applicable, as the materials are always on hand and the method is simple and quick. It consists in matching a given sample of caramel against a standard color consisting of a Nesslerized solution of ammonia. For carrying out the test make a stock solution of ammonium oxalate by dissolving 0.0417 Gm. of monohydrated ammonium oxalate, in crystals, in 1 liter of distilled water. Prepare the standard color by taking 10 Cc. of this stock solution, adding 38 Cc. of water and 2 Cc. of Nessler's solution. Match the standard color with the caramel, prepared as follows: Dissolve 1 Gm. of the caramel in water and make up to a liter. Run this solution from a burette into a Nessler glass

until, on dilution with distilled water to 50 Cc., it exactly matches the standard color. As an arbitrary standard, consider the standard caramel as one of which 0.01 Gm. (represented by 10 Cc. of the diluted solution made up to 50 Cc. with water) is required to match 50 Cc. of the color standard. Call this standard caramel 100 per cent. Caramel as found on the market will usually test around this figure.

To obtain the colorimetric value of any other caramel divide 100×10 by the number of Cc. of the diluted caramel solution required. For example, in a particular test, 20 Cc. of the solution of the sample of caramel were required to match the color standard. Then the colorimetric value of the caramel sample equals $\frac{100 \times 10}{20} = 50$ per cent. In other words, this particular sample was one-half strength—a convenient strength for making elixirs.—Amer. Journ. Pharm., Sept., 1911, 411, 412.

Liquor Cresoli Saponatus, G. P., V—Test for Hydrocarbons and Rosin Soap.—F. Raschig calls attention to the fallacy of the G. P., V test for the presence of higher boiling hydrocarbons or rosin soap in the official liquor cresolis saponatus, which depends on the production of a decided turbidity if 3 drops of the liquor are added to 6 Cc. of a 1 per cent. common salt solution. He proves experimentally that this turbidity is in reality evidence of a high content of meta-cresol, the desirable constituent which should be present in the official cresol in the amount of 50 per cent. Furthermore, he finds that soaps prepared from cresols containing phenol and much ortho-cresol, will produce clear mixtures with 1 per cent. salt solution even if the cresol contains hydrocarbons, but that soaps prepared from cresols containing only 43 per cent. of meta-cresol produce a decided turbidity. The test should therefore be amended so as to read: "If 3 drops of cresol soap solution are added to 6 Cc. of a sodium chloride solution (1 + 99), this must become turbid to complete opacity."—Pharm. Ztg., lvi (1911), No. 18, 180.

Dobell's Solution—Systematic Method of Analysis.—J. C. Buckner describes a systematic course for a complete assay of Dobell's solution in a paper read at the 1911 meeting of the Texas Pharmaceutical Association, the details of which are most advantageously consulted in the original and cannot be given here.—Proc. Texas Pharm. Assoc., 1911, 102–104.

Fehling's Solution—Historical Note.—B. Herstein traces the history of the development of sugar determinations by means of alkaline copper salts, culminating in the suggestion of a method by H. Fehling, published in 1848, and in greater detail in 1858, which is based upon the methods and observations previously discussed by Vogel (1815), Buchner (1815), Bucholtz, Peschier, Busch (1832), Trommer (1841), and Barreswil (1844). Fehling's merit consisted chiefly in having worked out with great care the details of the method, giving some account of the stoichiometrical equivalents, but neither did his solution keep for any length of time, nor did he,

any more than his predecessors, recognize the fact that the reaction is quantitative only within very narrow restrictions as to the concentration of the solutions and the time of reaction. This point has been established only by the concerted efforts of the many chemists who worked on the subject after Fehling, the necessity for keeping the copper solution divided into two parts being soon recognized. Soxhlet especially devoted much of his time to the study of the method, and established the exact conditions under which the determination must be carried out in order to get satisfactory results.—Chem. News, July 1, 1910, 6; from Jour. Amer. Chem. Soc., *32* (1910), No. 6.

Solutions of Ferric Salts—Oxidation with Potassium Chlorate.—Francis Hemm calls attention to the possibility of making the pharmacopœial formulas for a number of ferric solutions more convenient to the retail pharmacist by adopting the formulas recommended by J. Creuse, which are published in a foot-note to: *Liquor Ferri Subsulphatis*, *Liquor Ferri Tersulphatis*, and *Liquor Ferri Chloridi*, in the U. S. Dispensatory. These formulas are reproduced in the present paper—the improvement proposed by Mr. Creuse consisting in the use of potassium chlorate instead of nitric acid as the oxidizing agent.—Proc. Mo. Pharm. Assoc., 1910, 76–77.

Liquor Ferri Albuminati, G. P.—Conditions Necessary to Obtain a Satisfactory Preparation.—In the course of a very comprehensive study on the history, preparation, properties, composition, testing and preservation of solution of ferric albuminate, R. Lillig lays particular stress on the following conditions necessary to insure a satisfactory product possessing unlimited stability: The dialyzed solution of ferric oxychloride must be absolutely devoid of free ferric chloride. Fresh egg-albumen is preferable to the dried article, but a preliminary experiment must be made with a small quantity of the dialyzed iron to determine the exact quantity necessary for complete precipitation. Only well-boiled distilled water, cooled to 50° C., should be used, and the mixture must always be *very faintly* acid to prevent the loss by solubility of a portion of the precipitated ferric albuminate, which is washed with (distilled) water, cooled to 50° C., until chlorine is no longer detected in the wash-water. The washed precipitate must be dissolved without delay in the prescribed quantity of the strongly diluted sodium hydroxide solution (which must be free from carbonate), since delay is liable to cause the decomposition of the precipitate, and this is likewise decomposed by the action of strong soda solution or if heat is applied to favor solution. The finished product should be protected as completely as possible from exposure to light, air, direct sunlight, and variation in temperature.—Apoth. Ztg., xxvi (1911), Nos. 57–64, pp. 589, 597, 605, 620, 638, 648 and 659.

Liquor Ferri Albuminati—Ideal Formula.—John K. Thum states that the following formula and method of preparation for liquor ferri albuminati gives an ideal result:

Egg albumen (fresh)	200 Gm.
Solution ferric chloride	60 Gm.
Ammonia water	48 Cc.
Alcohol	120 Cc.
Aromatic elixir	400 Cc.
Solution sodium hydroxide (3 per cent.)	q. s.
Water, a sufficient quantity to make	1000 Cc.

Add the fresh egg albumen to one liter of water, mix thoroughly, and strain. Dilute the ammonia water with an equal volume of water and add in small amounts at a time to the solution of ferric chloride, shaking well each time until the precipitate formed is dissolved. Now dilute with 1000 Cc. of water and add to the albumen solution. Neutralize with solution of sodium hydroxide. When the resulting precipitate has subsided, wash with water until the supernatant liquid is free from chlorides, using silver nitrate T. S. as a reagent. Transfer the precipitate to a clean muslin strainer and remove the excess of water; when this is done put in a suitable container and dissolve by adding a sufficiency of solution of sodium hydroxide. Next add the alcohol, aromatic elixir and enough water to make 1000 Cc. —Amer. Drug., April 24, 1911, 241.

Liquor Ferri Caseinati—Formula.—Blaagaard recommends the following formula for preparing a solution of iron caseinate containing a definite quantity of casein: Triturate 20.0 dried casein with a mixture of 1.5 solution of sodium hydroxide (10 per cent.) and 10.0 water; after half an hour add 750.0 boiling water, and when complete solution results by stirring, add 100.0 iron saccharate (10 per cent.). When cool add 100.0 "Tinct. Portugal," strain after 24 hours, and adjust with water to 1000.0. The "Tinct. Portugal" is made by triturating the red-yellow outer rind (flavedo) of a medium-sized orange with 20.0 sugar, macerating the triturate during one day with sufficient alcohol to make 1000.0, and filtering.—Pharm. Ztg., lv (1910), No. 90, 907; from Arch. for Pharm. og Chem., 1910, No. 17.

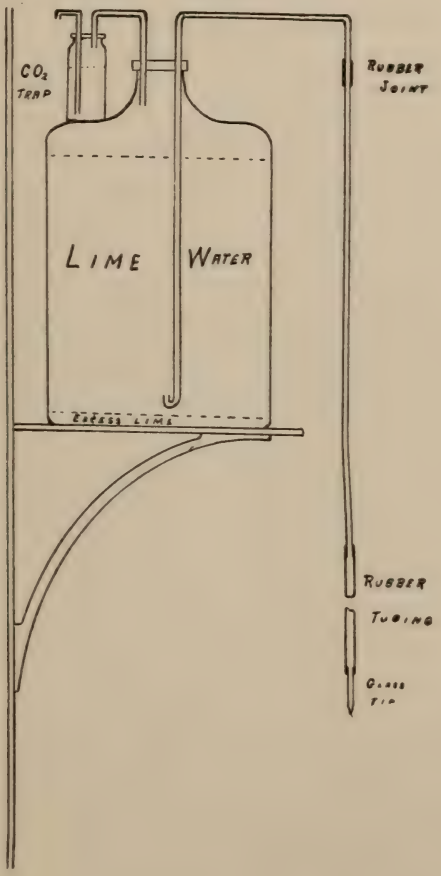
Compound Solution of Glycerophosphates—Satisfactory Formula.—Herbert E. Rice suggests the following formula for preparing compound solution of glycerophosphates which is modernly frequently prescribed. The product is perfect, and gives good satisfaction:

Calcium Glycerophosphate	128	grs
Sodium "	256	grs.
Iron "	24	grs.
Manganese "	19	grs.
Quinine "	8	grs.
Strychnine "	1	gr.
Glycerin	4	ozs.
Alcohol	1½	ozs.
Phosphoric Acid	100	minims
Solution of Saccharin, N. F.	1	dram
Tr. Orange	1	dram
Water to make	1	pint

Dissolve the calcium, sodium and manganese glycerophosphates in six ounces of water to which the phosphoric acid has been added. Dissolve the quinine and strychnine glycerophosphates in the alcohol. Mix and add the solution saccharin, tr. orange and glycerine. Dissolve the iron glycerophosphate in two ounces of hot water and add to the mixture, then add water to make 16 ozs. Filter.—The Apothecary, Febr. 1911, 24.

Lime Water—Apparatus for Keeping.—In Bulletin No. 150 of the Kentucky Experiment Station of the State University, Mr. Linwood A.

FIG 60.



Lime Water Apparatus.

Brown recommends the apparatus shown by Fig. 60, for preparing, storing and preserving lime water, which needs little description. The syphon tube is fitted through a stopper into which a CO_2 trap is also fitted. The stopper with fittings is then introduced into the neck of the bottle contain-

ing the lime water and a small excess of lime, the syphon being depressed to within a short distance from the layer of lime, from which the water may be drawn without disturbing the deposit owing to the small upward bend of the syphon tube, while carbon dioxide from the air is arrested by solution of sodium hydroxide or soda lime in the CO_2 trap. The author suggests the use of two bottles, each of 5-gallon capacity, the exhausted bottle being replaced by one just prepared in which the lime has settled completely before making the change.—Drug. Circ., Jan., 1911, 22.

The method above described by Mr. Brown has been previously described by others, who employed similar expedients. Mr. Otto Raubenheimer, endorsing the method of Mr. Brown, objects to the use of such large containers, considering it better to have containers just large enough to hold a two-weeks supply, at most. To prepare lime water the pharmacist should not use ordinary lime obtained from the builder, but lime of pharmacopœial quality, that is, calcined white marble, and he should not use ordinary hydrant water, but distilled water, which is free from carbon dioxide. Mr. Raubenheimer has very thoroughly described a method and apparatus similar to that advocated by Mr. Brown (see Proceedings, 1907, 180).—Amer. Drugg., Febr. 13, 1911, 74.

Lime Water—Simple Expedient for Constant Supply.—F. W. E. Steden recommends the following expedient for making and storing lime water which in his experience has proven very satisfactory: Procure a twenty- or thirty-gallon stone crock. Drill a hole through the side about twelve inches above the bottom and into this aperture fasten an ordinary plumber's spigot. Shake, fill, and wash several times, drawing off the wash product by means of the spigot until all of the undesirable, soluble impurities are removed, then fill up with water, mix well, and allow the lime to subside to the bottom of the crock below the spigot. When lime water is wanted, merely tap the spigot and draw into the dispensing bottle the quantity desired.—Bull. Pharm. Febr. 1911, 79.

Liq. Kali Arsenicosi, G. P., V—Criticism of New Formula.—The G. P., V directs the use of potassium bicarbonate in place of potassium carbonate heretofore directed in the formula for solution of potassium arsenite, probably to secure as nearly as possible a neutral solution, which is less liable than an alkaline solution to promote the conversion of the arsenous into arsenic acid on keeping. Stoecker, however, points out that the quantity (1 part) of bicarbonate directed is not sufficient to saturate 1 part of arsenous acid; the correct proportions should be 1.02 parts of bicarbonate to 1 part of the acid. But a more serious defect of the new formula resulting from this change is that the formation of potassium arsenite is very much slower when bicarbonate is used than with carbonate. Following the directions of the G. P., V, which are essentially the same as in the G. P., IV, he obtained after adjustment by dilution aud filtration a

solution containing only 0.76 per cent. of arsenous acid. In this experiment equal parts of the acid and bicarbonate had been boiled with 2 parts of water for 15 minutes before dilution. In a second experiment the acid and bicarbonate were triturated together with the water and boiled in a small dish during 3 hours, with frequent stirring and replenishment of evaporated water. On dilution to the proper quantity and after filtration, this solution was found to contain 0.937 per cent. of arsenous acid. It follows, that if bicarbonate is used it will become necessary to determine the arsenous acid content iodometrically in order to assure its proper strength; but a return to potassium carbonate, reducing the quantity to 0.75 parts for 1.0 part of acid, is regarded by the author as preferable. This assures quick solution, and a practically neutral product.—Apoth. Ztg., xxvi (1911), No. 34, 335.

Liq. Kali Arsenicosi, G. P. V—Efficiency of the New Formula.—Referring to the criticism of Stoecker regarding the replacement of potassium carbonate by the bicarbonate in the formula for liq. kali arsenicosi, G. P. V, Dr. Schenk concedes that the quantities of bicarbonate and arsenous acid are not in exact molecular proportion, which should be 1.03 and 1.0 parts respectively instead of equal parts. Nevertheless he expresses the conviction that the small quantity (0.03 Gm.) of arsenous acid remaining in a free state is also dissolved in the 2 Gm. of water at the boiling point, and is retained by the finished solution after dilution to the proper weight. This is practically confirmed by a series of experiments, which, moreover, controvert Stoecker's experience regarding the prolongation of boiling necessary to effect the complete conversion into potassium arsenite. His recorded experiments show that identical results are obtained when 1 Gm. each of potassium bicarbonate and arsenous acid are boiled for 3 minutes, or, under a reflux condenser, for 1½ hours, before dilution. In each case the product assayed 0.99 per cent. arsenous acid by the iodometric process, while a repetition of the experiment, using carbonate instead of bicarbonate, did not give quicker or better results.—Ibid., No. 38, 379.

J. Ziegler's experiments, carried out independently, also controvert the criticisms of Stoecker regarding the substitution of potassium bicarbonate for potassium carbonate in the formula for liq. kali arsenicosi, G. P., V., and confirm the results of Dr. Schenk in every practical particular. A solution from the shop-shelf, several months old, and one prepared strictly according to formula and directions of the G. P., V (boiling for only 2 minutes), when subjected to iodometric assay, showed in each case a content of 1.009 per cent. of arsenous acid; while a solution of potassium arsenite freshly prepared in strict conformity with the G. P., IV, showed a content of 1.019 per cent. A difference, consisting in the presence of 0.02 to 0.03 per cent. of arsenous acid in the free state, is regarded by the author as being practically unimportant.—Ibid., No. 40, 402.

Litmus Solution—Method of making a Stable and Sensitive Preparation

—A. Püschel recommends a method for preparing a very sensitive and stable solution of litmus which is dependent on the formation of a sulpho compound which is practically insoluble in cold water. On adding diluted sulphuric acid (4 per cent.) to an aqueous solution of litmus a dark brown-red precipitate is formed, which contains the essential violet litmus coloring-matter presumably as a sulpho compound. This may be freed from accompanying impurities by washing in a filter with cold water, and may then be dissolved in hot water and the solution neutralized with potassium hydroxide. So obtained the solution has the color and sensitiveness of a solution of the unchanged violet chromogen with the advantages of unlimited permanence.—Pharm. Ztg., lv (1910), No. 65, 657; from Oesterr. Chem. Ztg., 1910, No. 15.

Solution of Magnesium Citrate—Effective Sterilization.—M. D. Allen, admitting that the pharmacopœial method of preparing liquor magnesii citratis gives an excellent product, if prepared freshly as required or if the demand can be accurately gauged for not over 36 hours, says the manufacturer must resort to some method that will secure its preservation for a reasonable length of time. After using various methods, which he describes in brevity, the author found the following the most effective, using a slightly modified formula: The acid is dissolved in a small amount of hot water and the previously mixed magnesium carbonate, sugar, purified talc, and flavoring are added. When the reaction is completed, sufficient water is added, the solution filtered and filled into the bottles. These are closed, placed in an ordinary wash boiler, covered with water and boiled about thirty minutes; then placed on the shelf without any other precaution, it being only necessary to add the potassium bicarbonate when it is demanded by a customer. In the author's experience the solution so prepared and sterilized has kept for five months, as clear and effective as on the day it was made. In his modified formula, which follows, purified talc is introduced and a flavoring tincture (consisting of: Oil of lemon, fl. ʒ vi; oil of orange, fl. ʒ iv; tr. of ginger, fl. ʒ vi; and alcohol, q. s. ad. fl. ℥ iv) replaces the lemon flavor of the syrup, which in turn is replaced by sugar; the official quantities of citric acid and magnesium carbonate are also slightly reduced as shown in the following:

Citric acid	℥i, av.
Magnesium carbonate	℥ss, av.
Flavoring tincture	♏xxiv
Sugar	℥ii, av.
Purified talc	gr.xlviii
Water q. s. ad.	f℥xii

—Amer. Jour. Pharm., Dec., 1911, 565, 566.

Solution of Magnesium Citrate—A Preparation of Stability by a Slight Modification.—John F. McAnulty, Jr., says that a perfectly satisfactory

solution of magnesium citrate is obtained by a slight modification of the official formula. This modified formula would read :

Magnesium Carbonate	15.0 Gm.
Citric Acid	33.6 Gm.
Syrup Simplex	60.0 Cc.
Potassium Bicarbonate	2.5 Gm.
Oil of Lemon	0.65 Cc.
Water	9.0
	to make 350.0 Cc.

The resulting solution would conform to the Pharmacopœia in containing the proper amount of magnesium citrate, and would be decidedly simple to prepare. The oil of lemon should be added to the acid and magnesium carbonate before the reaction commences. The pharmacopœial instruction, "This solution should be freshly prepared when wanted," is superfluous, and is not often obeyed, as solution of magnesium citrate under proper conditions will keep for weeks. At the Philadelphia College of Pharmacy is a sample said to be 15 years old, and not a sign of decomposition, except darkening, has been observed.—Merk's Rep., Nov. 1910, 309–210.

Solution of Magnesium Citrate—Another Experience.—H. S. Carpenter says : "Our method of making solution of magnesium citrate is as follows : Take 2½ ounces of block magnesium carbonate (we prefer the block to the powder because it is much cleaner as a rule) and 5 ounces of citric acid. Introduce them into a half-gallon bottle and add a quart of water. This we allow to stand until the last bottle we have had put up is sold. Then add 10 ounces of syrup of citric acid and fill up the bottle to 60 ounces. Allow to stand from 3 to 10 days before filtering. Fill into a bottle as required and, after adding a potassium bicarbonate tablet, seal and label."—Bull. Pharm., October, 1910, 430.

Solution of Mercuric Biniodide in Oil.—A method for its preparation is described by H. A. B. Dunning in "Proceedings," 1910, 1123–1124.

Solution of Sodium Ethylate B. P.—Cause and Prevention of Discoloration.—According to the official description, solution of sodium ethylate is a colorless liquid becoming brown by keeping, and, being only employed occasionally, this discoloration usually happens when kept in stock. H. Finnemore attributes this change of color to the action of the alkali on the acet-aldehyde, which is always present in small quantity in commercial absolute alcohol, and after trying various methods to get rid of this impurity, was most successful by boiling the alcohol for one hour with sodium phenylhydrazine, as employed by Hewitt, and then distilling. A distillate free from acet-aldehyde is thus secured, but when kept for a long time some of the latter is gradually reformed and the solution of sodium ethylate becomes discolored. In the course of some experiments on

another subject the author observed the great depth of color when sodium ethylate solution was used, whereas, when

Solution of Sodium Methylate was employed no discoloration resulted. The use of methyl alcohol in place of ethyl alcohol is therefore suggested to prepare an equivalent caustic solution, which, in the experience of the author, using Kahlbaum's No. 1 methyl alcohol, showed no trace of discoloration after two years.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 425.

Terpin Hydrate Solution.—A perfect and satisfactory preparation is described by Frank W. A. Hain, in "Proceedings," 1910, 1259–1260.

MAGMA.

Magma Magnesia—Revised Formula.—S. L. Hilton describes a formula and process for the preparation of magma of magnesia, which may be briefly outlined as follows:—A filtered solution of 350 Gm. magnesium sulphate in 400 Cc. distilled water is mixed with a hot filtered solution of 0.150 Gm. gelatin in 50 Cc. of distilled water, washing the latter filter with not exceeding 250 Cc. more of water. To the mixed solution, reduced to room temperature, a solution of 119 Gm. sodium hydroxide in 700 Cc. of distilled water, also at room temperature, is added by rapid drops, stirring briskly until all has been added. Then dilute with distilled water to 3000 Cc., allow the preciptate to settle to the 1000 Cc. mark on the vessel, then decant the supernatant liquid and repeat the washing operation twice, with 2500 and 3000 Cc. of added water. The 1000 Cc. of magma thus obtained is then assayed by a described process so that the finished preparation will contain 7.5 per cent. of Mg. $(OH)_2$.—Amer. Journ. Pharm., June, 1911, 268.

Milk of Magnesia—Preparation on Short Notice.—The following formula for preparing "Milk of magnesia on short notice," recommended by W. F. Kaiser is here given *verbatim:*

"Take 6 oz. mag. sulp. and 3 oz. pot. or sod. hydroxide. Dissolve each separately in 10 oz. water and filter, put into ½ gal. bottle *quick* and shake vigorously for a few minutes, then put on a filter folded once to let water drain off. The resultant magma is put back in half gallon bottle and 3 pints of fresh water added and again shaken well to wash out excess pot. or sod. hydroxide; again put on a new filter, to allow the water to drain off. Lastly, rinse bottle with 4 oz. distilled water and pour over magma in filter from which the water has been drained, to insure washing off any excess pot. or sod. hydroxide; when water ceases to drip, scoop magma from filter, put in bottle and add enough distilled water to make one pint."—Proc. Wisc. Pharm. Assoc., 1910, 63.

MISTURÆ.

Mistura Aromatica Composita—Formula.—In connection with his article on "Bitterless Fluidextract of Cascara Sagrada" (which see under "Fluidextracta"), Dr. B. Börner gives the following formula for "Mistura Aromatica Composita": Tinct. cort. aurant, 300.0; Essent. aromat. (Spir. aromat. Phar. Austr. = Spir. melissae Comp. Phar. Germ.? Rep.), 200.0; Vanillin, 5.0; Aether acetici., 20.0; Spirit., 100.0; Arac essence, 60.0; Tinct. zingiber., 50.0.

Chalk Mixture—Improved Formula.—Prof. Philemon E. Hommel says sugar must be removed from chalk mixture; it is positively injurious. The compound chalk powder should be dismissed, and the following formula adopted for the chalk mixture:

Prepared chalk	15 Gm.
Acacia, in fine powder	10 Gm.
Glycerin	15 Cc.
Cinnamon water	150 Cc.
Distilled water	q. s. to make 250 Cc.

To be freshly made when wanted.—Merck's Rep., Febr., 1911, 46.

Mistura Glycyrrhizae Composita—Improved Formula.—Prof. Philemon E. Hommel suggests the following formula for brown mixture, which he believes to be the best yet proposed:

Fluidextract glycyrrhiza	120 Cc.
Glycerin	150 Cc.
Camph. tinct. opium	120 Cc.
Wine antimony	60 Cc.
Spir. nitrous ether	30 Cc.
Distilled water	q. s. to make 1000 Cc.

—Merck's Rep., Sept., 1910, 253.

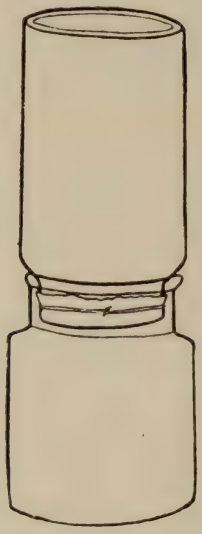
MUCILAGINES.

Mucilage of Acacia—Extemporaneous Preparation from Purified Acacia.—Dr. O. Schweissinger recommends a purified gum arabic, recently introduced on the market, for the preparation of mucilage of acacia. This product, "Gummi arabicum resiccatum," is obtained by dissolving acacia, filtering the solution, and again drying in vacuo, and is so rapidly soluble in water that the mucilage may quickly be prepared extemporaneously.—Pharm. Zentralh., li (1910), No. 45, 1027.

Mucilage Container—A Practical Device.—George W. Hague makes a useful mucilage container as follows: Select a four, or even a three ounce w. m. bottle, pour into it a bottle of mucilage, and tie over the mouth of the bottle three thicknesses ot cheese cloth; then turn the bottle over and set

its mouth into the mouth of a small ointment jar, as shown by Fig. 61. The mouth of the bottle is always wet on the outer side of the gauze and

FIG. 61.



Mucilage Container.

when paste is needed for a label, the label is rubbed across the mouth of the bottle. That is all.—Meyer Bros. Drugg., Jan., 1911, 10.

OLEA.

Ferrated Cod Liver oil—Improved Formula and Process.—K. Feist and W. Auernhammer, having found the iron-soap directed in the formula of the "Supplement" to the Phar. Germ. iv to be very sparingly soluble, have experimented and succeeded in producing a very satisfactory iron-soap as follows: 140 p. linseed (sesame or almond) oil are saponified by means of 107 p. solution of potassium hydroxide (25 per cent.), 30 p. alcohol, and sufficient water to make 350 p. of liquid soap. This is diluted with 1500 p. of water and precipitated with a mixture of 100 p. of solution of iron sesquichloride and 500 p. of water. After standing one hour, the precipitated iron-soap is dissolved in 250 p. of ether, and the ethereal solution is dehydrated by agitation with dried sodium sulphate; whereupon the ether is distilled off or evaporated and the residual iron-soap dissolved in sufficient cod liver oil to make 1000 parts. The product should contain 1 per cent. of iron, but this must confirmed by incinerating 20.0 Gm., and the oil may then be diluted as required—the ferrated oil of the "supplement" demanding a content of 0.2 per cent. Fe.—Pharm. Ztg., lv (1910), No. 90, 907.

Ferrated Cod-Liver Oil—Preparation with Ferric Benzoate.—Const. Kollo points out that the solubility of ferric benzoate in cod-liver oil depends on the method of its preparation and the care with which it has been preserved, and therefore considers it best that pharmacists prepare this salt themselves to assure its proper quality, for which purpose he recommends the following formula: 6 Gm. of pulverized benzoic acid are suspended in 120 Gm. of distilled water and accurately neutralized with 10 per cent. ammonia, of which about 8.5 Gm. are required. The filtered solution is transferred into a wide and deep porcelain basin, and a solution of 9.5 Gm. of solution of ferric chloride of sp. gr. 1.280–1.282, previously diluted with 250 Gm. of distilled water and neutralized with ammonia as accurately as possible, is added with assiduous stirring. The voluminous precipitate is allowed to subside, washed until the washings no longer give a chlorine reaction, drained, and rapidly dried.—Pharm. Ztg., lvi (1911), No. 54, 544; from Pharm. Post, 1911, No. 51.

Iodized Oils—Comparative Absorbability with Iodides.—M. Lafay observes that among the large number of iodides which are used in medicine there are some, such as the iodides of arsenic, iron, and mercury, in which the action of the iodine is of secondary importance. Others, such as the iodides of the alkalies and the alkaline earths, are used principally for the iodine which they contain, although the action of the metal is not altogether negligible. Iodized oils are true organic combinations, resulting from the fixation of iodine, hydriodic acid, or even chloride of iodine by vegetable oils. When it is necessary to introduce quickly a large amount of iodine into the system iodide of potassium is used. When the action need not be so hurried recourse is had to daily injections of 5 to 20 Cc. of iodized oil containing 40 per cent. of iodine. The iodized oils are preferred to the iodides, because they are more easily tolerated, and are regular and continuous in action. Whenever the iodides or other derivatives of iodine are not available or are badly tolerated it is well to bear in mind that the iodized oils can be administered in large doses by hypodermic injection, without pain, danger, or fear of iodism.—Pharm. Journ. and Pharmacist, July 29, 1911, 136; from Journ. de Pharm. et Chim., July 1, 1911.

Phosphorated Oil—Precaution.—C. E. Carlson recommends that the phosphorus clippings intended for solution in oil be immersed temporarily in *ice water*, thus obviating the danger from spontaneous ignition to which the dry phosphorus is inclined.—Pharm. Ztg., lv (1910), No. 65, 656; from Svensk. Farm. Tidskr., 1910, No. 12.

Phosphorus Oil—Estimation of Phosphorus.—Dr. O. Fry recommends a modification of the method of Wörner-Neumann for the estimation of phosphorus in oils. This consists in brevity of oxidation of the phosphorus into phosphoric acid by the action of fuming nitric acid in excess

and under certain precautions, then adding a certain amount of paraffin, which on congealing retains the oil and permits the convenient separation of the aqueous layer containing all the phosphoric acid produced from the sample. The acid is then determined in the aqueous layer by means of ammonium molybdate, in the usual manner.—Pharm. Ztg., lvi (1911), No. 3, 26; from Pharm. Post, 1910, No. 100.

OLEATA.

Oleate of Mercury—Preparation by Precipitation.—R. C. Cowley proposes a precipitation process for producing a definite and stable oleate of mercury, similar to an American preparation for which particular merit is claimed. It is obtained as follows:

Mercury	100 grains.
Nitric acid	200 Cc.
Dried hard soap	300 grams.

Dissolve the mercury in the nitric acid, heat to oxidize the mercury compound to the mercuric condition, evaporate the solution until a film forms on the surface, add the soap dissolved in 1000 Cc. of water, stirring well, separate the mercuric oleate and dry.—Chem. & Drug., Jan. 7, 1911, 52.

OLEORESINA.

Oleoresin of Male Fern—Dose Depending on Method of Administration.—While the German Pharmacopœia prescribes a maximum daily dose of 10 Gm., Dr. Drenkhahn has hitherto always given extract of male fern in doses of 15 to 20 Gm. to adults and 8 to 10 Gm. to children, without ever observing symptoms of poisoning. This is perhaps due to the method of administration adopted; the poisonous principle, filicic acid, is nearly insoluble in water, but soluble in alkalies and fats, and these are therefore carefully avoided, in order that filicic acid shall not be absorbed when in the intestine. A dose of cascara or rhubarb is first given, if necessary, but castor oil and alkaline laxatives are avoided; all fat food is forbidden on the day on which the extract of male fern is given and the following day. A large quantity of raspberries is given overnight, and in the morning a cup of sweet black coffee, without bread, and after an hour's interval 3 Gm. of male fern extract every ten minutes, or 5 Gm. every fifteen minutes, with sweetened diluted lemon-juice or solution of citric acid; the quantity of the extract thus taken in an hour is 18 to 20 Gm. If evacuation of the bowels does not occur within an hour after the last dose, it is followed by a dose of 0.6 Gm. of calomel.—Apoth. Ztg. xxvi (1911), No. 79, 837; from Münch. Med. Wschr. 1911, 2020.

Extract of Male Fern—Frequent Adulteration with Castor Oil.—Ernest J. Parry has examined twenty samples of extract of male fern obtained from various sources, and found them, with a single exception, adulterated

with castor oil, amounting to from 30 to 60 per cent. These adulterated extracts were all of the same type, and much brighter green in color than the genuine extract. The author has determined the

Constants of Genuine Extract of Male Fern, carefully prepared according to the official process by Mr. J. C. Umney, to be as follows:—

Sp. Gr. at. 15° C., not below 1.000, usually 1.004–1.025.

Refraction Index at 20° C., not below 1.500, usually, 1.5050–1.5090.

Solubility in Petroleum Ether, complete in 10 volumes, with exception of a little flocculent matter, but no oily separation.

Saponification Value, 230 to 250; unsaponifiable matter not above 8 to 11 per cent.

Fatty Acids should have a mean combining weight of from 240 to 255.

Crude Filicin, determined by the Pharm. Helv., should not be below 20 per cent., usually 22 to 23 per cent. This is regarded as of greatest importance—the test being carried out as follows: 5 Gm. of the extract are dissolved in 30 Gm. of ether, and the solution is well shaken with 100 Gm. of a 3 per cent. solution of barium hydroxide for 5 to 10 minutes. After complete separation, the aqueous liquid is filtered, and 85 Cc. of the filtrate (= 4 Gm. of extract) is acidified with 2.5 Cc. of strong. hydrochloric acid and shaken out four times with ether. The ethereal extracts are mixed, filtered, evaporated, and the residue is dried at 100° C. to constant weight.—Pharm. Journ. and Pharmacist, Dec. 9, 1911, 778.

PETROLATA.

Petrox Preparations—Improved Formulas for the N. F.—George M. Beringer and George M. Beringer, Jr., publish a large number of formulas which, in so far as they replace the formulas now official in the N. F. under the class titles "Petrolatum Saponatum Liquidum" and "Petrolatum Saponatum Spissum," have been modified and improved so as to produce more satisfactory preparations, and for them the specific Latin title "Petroxolinum" (Engl. synonyms: Petroxolin and Petrox) has been adopted by the committee. The improvements in formulas consist mainly in the correction of odor (due to the oleic acid) by the addition of oil of lavender flowers, and the substitution of stronger ammonia water for the 10 per cent. water now directed, while the working directions are modified so as to secure uniformity if accurately followed. While the "Liquid Petrox" will answer as the base for most of the petrox preparations, it cannot be used for some of the important formulas, in which the medicament must be incorporated in the course of preparing the base, as, for example, in "Iodine Petrox" and "Iodoform Petrox," and deviation from these directions, or careless manipulation, may spoil the product. It must suffice to give here only the improved formulas for the solid and liquid petrox, which are as follows:

Petroxolinum Liquidum (Liquid Petroxolin; Liquid Petrox): Liquid petrolatum, 50 Gm.; oleic acid, 28 Gm.; oil of lavender flowers, 2 Gm.; stronger ammonia water, 5 Gm.; alcohol, 15 Gm. Mix the liquid petrolatum, oleic acid and oil of lavender flowers in a flask, then add the alcohol and finally the stronger ammonia water and agitate thoroughly until clear, warming the mixture slightly on a water-bath if necessary.

Petroxolinum Spissum (Solid Petroxolin; Solid Petrox): Paraffin, 37 Gm.; liquid petrolatum, 20 Gm.; oleic acid, 30 Gm.; oil of lavender flowers, 3 Gm.; alcohol, 5 Gm.; stronger ammonia water, 5 Gm. Melt the paraffin with the liquid petrolatum on a water-bath, add the oleic acid and transfer the mixture at once to a warm mortar; immediately add the oil of lavender flowers and the mixed alcohol and ammonia water and stir continuously until cool.—Amer. Journ. Pharm., May, 1921, 213–223.

Petroxolinum Spissum—Substitution of Ceresin for Paraffin.—Otto Raubenheimer believes that solid petrox should have a firmer consistence than is provided by the formula proposed by Mr. Beringer for the revised edition of the N. F., and recommends for this purpose not alone a change in quantity (from 37 Gm. to 40 Gm.) but also the substitution of ceresin for the paraffin directed, or, better, the substitution of 60 Gm. of the ung. paraffin of the G. P. (ceresin, 4 p.; wool-fat, 1 p.; liq. petrol., 5 p.) for the paraffin and liquid petrolatum. Ceresin has a considerably higher melting point, and is a refined "earth wax," entirely different from American paraffin in physical and even chemical characteristics. Moreover, it is a component of the so-called "vasogen," which it is intended to replace by the petrox preparations.—Amer. Journ. Pharm., May, 1911, 223.

Vasolimentum Salicylatum, 10 p. c.—Formula.—J. Lorenzen recommends the following formula for preparing a 10 per cent. vasolimentum salicylatum: Acid. salicyl., 3.0 Gm.; alcohol absol., 2.0 Gm.; aether, 2.0 Gm.; vasoliment. liquid, ad. 30.0 Gm. By increasing the quantity of ether a preparation containing a higher salicylic acid percentage may be made.—Apoth. Ztg., xxvi (1911), No. 29, 283.

PILULÆ.

Blaud Pills—Commercial Composition.—Albert E. Parkes and John D. Roberts communicate the results of examination of a large number of commercial samples of Blaud pills, with special reference to their conformity to the B. P. formula in the composition of the pill mass, and to the character of their coating. They found the pill mass to differ considerably from the official formula in many cases. Many of the samples were evidently made from ferrous carbonate, which was probably first prepared by precipitation with sodium carbonate, and the precipitate, without washing, made up into pills. Some of the samples were also deficient in iron. Most of the pills were the so-called "pearl-coated" variety, for

which purpose steatite (magnesium silicate) is principally used. There is evidence, also, that in some cases steatite is added to the pill mass itself. The authors regard the use of silicious matter as being reprehensible, and quite unnecessary as an excipient. When such pills are allowed to disintegrate in water or dilute acid, the coating, under the microscope, has the appearance of transparent, sharp, angular particles, resembling finely-ground glass, and the ingestion of such silicious matter by persons in delicate health must be attended with grave risks.—Pharm. Journ. and Pharmacist, Sept. 2, 1911, 320.

Calcium Sulphide Pills and Tablets, their alleged liability to deterioration and a method for their examination, is the subject of a paper by M. R. Schmidt and H. Engelhardt, which appears in "Proceedings," 1910, 1005–1006.

Pil. Extr. Fuci Comp.—A Danish Anti-fat Pill.—The Copenhagen Apothecaries Society publishes the following formula for an anti-fat pill under the title of "pil. extr. fuci comp." :—Extr. fuc. vesicul. sicc., 6.0; extr. frangul. sicc., 5.0; extr. rhamn. purshian. sicc., 5.0; extr. aloes, 2.0; extr. rhei., 1.0; carrageen pulv., 1.0; spir. dil. g. s. m. f. pil. No. 100 argent. obduct. D. S. antifat pills. One pill, increasing to two pills, morning and night.—Pharm. Ztg., lv (1910), No. 72, 724; from Arch. for Pharmaci og Chemi, 1910, 175.

PULVERES.

Effervescent Salts—Preference to the Dry Powdery Form.—Frank L. Cheney says it is not a difficult operation to manufacture most effervescent salts on a small scale, especially in the dry powder form of the National Formulary. The granular salts of the U. S. P. and N. F. require a little more manipulation than the powder and possess no more therapeutic value, and he has found that the powder form is quite as popular with physicians and the laity as the granular form. The only precaution to be observed in the preparation of the dry powder form of effervescent salts is to have all the ingredients thoroughly dry.—Proc. Vermont Pharm. Assoc., 1910, 45–47.

Granular Effervescent Salts—Commercial Production.—Daniel M. Grosh contributes interesting information concerning the industrial production of granular effervescent salts. The original process for making these popular preparations was tedious and expensive, and it was not until the cost of manufacture was cheapened that the product became the popular article it is to-day.

Climatic conditions govern the making of this preparation more than of any other pharmaceutical production, and the condition of the weather can turn an easy process into a batch of trouble. The general process is simplicity itself, and yet good results are exceedingly hard to obtain, due

to the fact that the operator must be experienced in allowing for the climatic conditions. The base of all the salts is a combination of citric and tartaric acids, sugar and sodium bicarbonate, the proportions of which vary. Generally two formulas are used, one for dry weather and one for wet or humid weather. In wet weather the citric acid is reduced and the tartaric acid increased, always taking care to preserve the relative weights. The old process consisted of wetting the mass with alcohol to form the granules. Of course, the alcohol was lost in drying unless the maker had the necessary apparatus for recovering the alcohol by condensation. At the present time the ingredients are mixed and sifted by power machines. It is then spread to a depth varying from one-half inch to two inches on an endless belt of canvas which slowly moves through a closet or low room heated to the temperature necessary to mass the product. The molecule of water in the citric acid in combination with the heat produces this result. The closet is of sufficient length to impart heat to the product in its travel, and the heat is regulated and governed by a thermostat.—Mercks' Rep., Oct., 1911, 281.

Effervescent Preparations of the U. S. P. and N. F. are discussed in a paper by W. J. Lowry, Jr., and formulas for granular effervescent salts given in a paper which appears in "Proceedings," 1910, 1234–1241.

Compound Licorice Powder—Examination of Commercial Samples.—G. E. Scott-Smith and J. Evans have examined over a hundred samples of compound licorice powder during the last three years, and have been much impressed with the great diversity in appearance of the samples, while various instances of careless manufacture have been apparent. In several instances the sulphur was present to the extent of 16 per cent., *i. e.*, nearly double the amount of the B. P. requirement, while in other cases the sulphur was entirely absent; other samples again gave evidence of containing senna and fennel in traces only. Many instances of gross adulteration with ground olive stones and ground almond shells were noted, due apparently to the use of foreign ground licorice root, which is subject to these adulterations. The amount of moisture in the samples examined varied from 3.7 to 4.2 per cent., but several showed 8.5 per cent. It is pointed out that the percentage of soluble ash is of no value in detecting exhausted drugs in compound licorice powder, while the amount of extractive yielded to 70 per cent. alcohol, as suggested by some observers, is of little value for detecting the presence of exhausted ingredients, as the whole of the sugar is soluble in such alcohol. The authors use an oxidation method, by means of nitric acid, for the determination of sulphur as sulphate; carbon disulphide for the purpose is unreliable.—Pharm. Journ. and Pharmacist, July 1, 1911, 9; from Analyst, May, 1911, 198.

Powdered Blaud's Mass—Formula.—George M. Beringer, Jr., having occasion to prepare tablets a few years ago representing Blaud's pills,

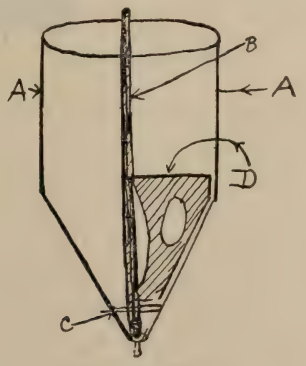
found it almost impossible to dry the mixture when prepared as directed for pilulæ ferri carbonatis, U. S. P., the glycerine, of course, being omitted. The following formula has, however, been used with success:

Exsiccated ferrous sulphate	105 Gm.
Potass. carbonate	80 Gm.
Powdered sugar	105 Gm.
Powdered acacia	10 Gm.

Rub the potassium carbonate with 10 Cc. of water and add the other ingredients, previously mixed. Rub till evenly colored. Dry in an oven and powder. Preserve in tightly-stoppered bottles. This is equivalent to about 1000 pills U. S. P. There seems to be considerable demand for "Powdered Blaud's Mass," which, as prepared by this formula, can be kept for a considerable time without appreciable change.—Proc. N. J. Pharm. Assoc., 1911, 71.

Powder-Filler—A Practical Device.—Frank E. Ernst has found the rapid powder-filler shown in the accompanying sketch (Fig. 62) useful for filling

FIG. 62.



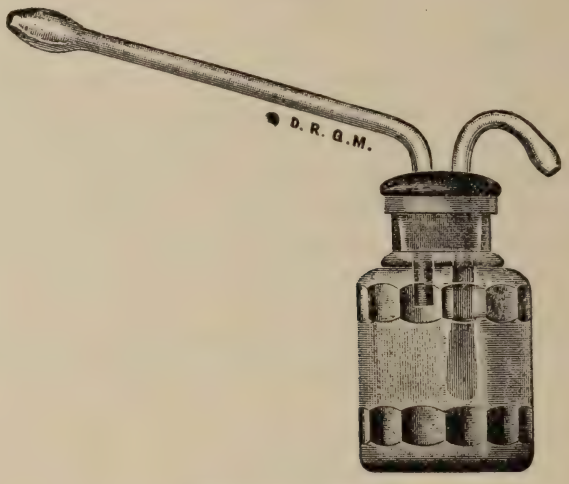
Powder-Filler.

tooth powder, talcum, toilet powders, etc., containers. It consists of a cylindrical reservoir, *A*, with a conical funnel-shaped base; a substantial stirring rod, *B*, of brass, considerably longer than the height of the apparatus, is passed through a metal disc, *C*, or stopper, diameter one and one-half inches, and soldered in place so that the stirring rod may protrude about one-half inch through the orifice in the base of the funnel. The metal disc acts as a stopper for funnel outlet; flanges, *D*, fitting interior of reservoir and soldered vertically to the stirring rod above the closing disc, overcome the clogging tendency of the powders.—The Apothecary, November, 1911, 18–26.

Powder Insufflator—Convenient Form.—Prof. Hartmann recommends the powder insufflator shown by Fig. 63, which is operated by the patient

for the insufflation of certain powdered medicaments by inserting the olive-bulb into one nostril and having closed the other nostril with the finger drawing in air through the former. By adjusting a rubber bulb to the

FIG. 63.



Powder Insufflator.

short tube reaching into the powder a simple powdered spray-apparatus is produced, which may serve a variety of purposes.—Pharm. Ztg. lvi (1911), No. 77, 775.

RESINÆ.

White and Brown Scammony Resins—Chemical Identity.—The French Pharmacopœia excludes white scammony resins, but both white and brown resins are found in commerce, and L. Bourdet has subjected these to comparative tests. The tests he employed were as follows:—Solubility in 90 per cent. alcohol; in ether of specific gravity 0.720; in ammonia; in solution of soda; the solution in soda solution treated with hydrochloric acid; the same solution with nitric acid; the same solution with suphuric acid; the same solution with acetic acid. The behavior of both brown and white scammony was identical throughout. The author, therefore, considers that the French Pharmacopœia ought to admit white resins. With regard to the solubility in ether it should be said that the resin "is almost completely soluble in ether of specific gravity 0.720."—Pharm. Journ. and Pharmacist, July 22, 1911, 101; from Journ. de Pharm. et Chim. July 1, 1911, 18.

Caulophyllin—Solubilities and Characteristic Test.—Caulophyllin, prepared by precipitating the resins from an alcoholic tincture of blue cohosh, *Caulophyllum thalictroides*, with water, and collecting and drying the precipitate, has been found on examination by J. F. H. Gilbard to contain

moisture (loss at 100° C.), 8.0; matters soluble in 80 per cent. alcohol, 72.5; matters insoluble in 80 per cent. alcohol, 19.5; total matter soluble in cold water, 51.5. The following is suggested as a specific test for caulophyllin:—Five Cc. of an alcoholic extract, obtained by digesting 0.1 Gm. of caulophyllin in 25 Cc. of 80 per cent. alcohol, and filtering, are evaporated to dryness on the water-bath in a flat porcelain capsule. The residue is taken up with 1 Cc. of water, and broken up with a flat-headed rod. Two Cc. of concentrated sulphuric acid are then slowly added, and the mixture well stirred. An intense purple-blue color is produced within five minutes. With some specimens of caulophyllin the color is more inclined to reddish-purple. When testing a mixture of drugs, *e. g.*, a compound pill, 0.1 Gm. of the pill is repeatedly extracted with 80 per cent. alcohol, filtered, and the filtrate evaporated in a porcelain capsule. The residue is broken up with 1 Cc. of water, and 2 Cc. of concentrated sulphuric acid are added. If caulophyllin be present, a distinct blue color will be shown at the edges after a few minutes. The reaction is best seen be daylight, or by the light of burning magnesium. The reaction appears to be characteristic of this resin, or of some constituent of it. The resins of many other drugs which were tested at the same time did not give the reaction.—Pharm. Journ. and Pharmacist, July 22, 1911, 101; from Analyst, June, 1911, 270.

SAPONES.

Sapo, U. S. P.—Formula and Explicit Directions for Making a Reliable Product.—In a paper read before the 1911 annual meeting of the National Association of Pharmacologists, Chas. H. Bowersox communicates a formula and gives explicit details for the preparation of "Home-made Castile Soap," which are here reproduced because, like the author, others may find it desirable to produce an article that is uniformly suitable for making soap liniment, which, in his experience, is rarely the case with the Castile soap of the market. Using only materials of the best quality, the soap produced resembles in appearance and action one of the two only commercial brands he has found satisfactory, and these are often not obtainable in the market. The formula is as follows:

Sodium hydroxide	75 Gm.
Olive oil	425 Gm.
Sodium chloride	125 Gm.
Distilled water	2500 Gm.

Dissolve the sodium hydroxide in 400 Gm. of distilled water (using a vessel of silver, iron or hard glass) and set the solution aside until it has become perfectly cold. Now introduce the oil into a cylindrical vessel made of hard glass (a candy jar will do) and pour the solution of sodium hydroxide gradually into it, and at the same time stir gently with an iron or glass rod. Continue stirring slowly and without intermission until the

lye and oil are thoroughly combined, which will require about ten minutes, then construct a cover of several thicknesses of paper and fasten it securely over the top of the jar to prevent atmospheric action, and to hasten the reaction between the alkali and the oil. Set the jar and its contents aside in a warm place until saponification is complete (which will require about eighty hours). Now transfer the contents to a silver or bright iron kettle of the capacity of about 3800 Cc. and add 1600 Gm. of distilled water. Heat until the magma is dissolved or becomes transparent and rather tenacious, then remove from the fire. Next introduce 500 Gm. of distilled water into a suitable vessel and place over fire; quickly raise the temperature, and at the moment of ebullition, remove from the fire. Dissolve the sodium chloride in the hot water at once, and immediately incorporate the hot saline solution with the hot soap solution, stirring until the glycerin is liberated and the excess of water has separated from the curd, which should require but a few seconds. If soap formation is not manifest almost immediately after the solution of sodium chloride has been added (which may be known by the milk-like appearance of the mixture) place the vessel over a fire and heat moderately until the formation does begin to take place, then set it aside for about twenty hours to permit all the soap to rise to the surface and form a solid mass. The soap having formed, make a small incision through it near the edge and drain off the liquid in the bottom of the vessel. The solid can then easily be removed by gently tapping on the side and bottom of container. Cut the soap (which now contains from 35 per cent. to 70 per cent. of water, depending upon the shape and size of the vessel in which it was made) into desired size, wash off with clear water and allow it to dry spontaneously until it has lost all but a trace of water.—Drugg. Circ., August, 1911, 409.

"Grit" or Pumice Soap—Preparation.—John K. Thum, pharmacist at the German Hospital, Philadelphia, communicates the following formula and process for preparing a "grit" or pumice soap that is more satisfactory (being less alkaline) than the pumice soaps usually supplied and lately used in place of ordinary hard, soft or liquid soap for thoroughly cleansing the surgeon's hands preceding a surgical operation:

Cottonseed oil	500 Cc.
Stearic acid	500 Gm.
Sodium hydroxide	150 Gm.
Alcohol	150 Cc.
Sodium chloride (20 per cent. solution)	q. s.
Distilled water	q. s.
Powdered pumice	300 Gm.

Heat the oil and acid until the latter is completely dissolved, add the sodium hydroxide dissolved in a liter of the water, and heat with constant

stirring for 15 minutes. Next add the alcohol and stir until saponification is completed and a homogeneous mixture results. Then add one liter of 20 per cent. solution of sodium chloride and stir vigorously. Allow to stand until the soap is hardened, drain off the alkaline liquid by punching a hole in the soapy mass on one side, and wash the soap two or three times with distilled water. Then melt the soap, and while still on the fire thoroughly incorporate the powdered pumice. While still hot the soap is poured into suitable moulds, and in 24 hours it is sufficiently hard for use. Amer. Journ. Pharm., March, 1911, 111.

Medicinal Soaps—Preparation and Composition.—H. Gradenwitz contributes a comprehensive treatise on the technical production of soap for medicinal purposes, which does not differ from that in common practice for producing good toilet soaps, except that it is of paramount importance that only the purest material be used and the most perfect methods of purification be adopted. The basic soap must be boiled from pure fats, carefully and repeatedly "salted out," and perfectly neutral. The medicinal additions, which must meet the pharmacopœial requirements, must not be incompatible among themselves nor with the saponaceous base, and the admixture of these must be under conditions that secure uniform distribution throughout the mass. The author gives details of preparation in a number of examples, which must be consulted in the original.—Pharm. Ztg., lvi (1911), No. 11, 106; from "Unna-Festschrift," vol. I.

Soaps—Estimation of Water.—R. M. Fitzpatrick finds that the following method for the estimation of water in soaps give good results: One gramme of the sample of soap is weighed from a weighing bottle into a 200-Cc. conical flask, 50 Cc. of absolute alcohol added, and warmth applied to dissolve the soap completely. The solution is allowed to cool somewhat, and filtered through a filter-paper into another 200-Cc. conical flask, the first being washed out with about 20 Cc. of absolute alcohol, so as to convey all undissolved matter onto the filter, which is then washed with absolute alcohol. The filter-paper with the residue is dried in the steam oven, cooled in a desiccator, and weighed. The weight of the alcohol-insoluble matter in the soap is thus found. The filtrate is allowed to become quite cold, and 5 Gm. of anhydrous sodium sulphate added. The flask is corked, and allowed to stand over night. The solution is then filtered into a 200-Cc. conical flask which has previously been weighed along with a fragment of porous tile. The sodium sulphate remaining in the flask and on the filter is washed two or three times with warm absolute alcohol. The alcohol is evaporated off on the water-bath, and the residual soap dried in a steam oven for fifteen minutes. The flask and soap are cooled in a desiccator, corked, and weighed. From this the weight of anhydrous soap is found. The weight plus the weight of alcohol-insoluble residue, subtracted from the weight of soap taken, gives the weight of

water; hence the percentage of water is calculated. A necessary point to observe is that the solution before addition of the sodium sulphate does not deposit any soap jelly. If this happens more alcohol must be added. The total volume of alcohol should not exceed about 110 Cc.—Chem. News, Nov. 24, 1911, 247.

Soap—Method of Determining Detergent Power.—The principal difficulty in comparing the cleansing powers of different soaps by actually washing dirty goods with them lies in the absence of any standard of dirtiness. A. A. Shukoff and P. I. Schestakoff have now found it possible to prepare an artificial equivalent of dirty clothes by treating cotton-wool material with a solution of lanolin in benzine, to which lampblack has been added. The goods so prepared are then washed with the different soaps by means of a washing machine, under constant conditions of time, temperature, concentration of the soap solution, etc. The results arrived at show that soaps are to be placed in the following order, when judged by their cleansing power: Tallow soap, soap from liquid vegetable oils and olein, coconut oil and palm-oil soaps, resin soaps. It was also found that the concentration of the soap solution has a great influence on the cleansing power, a solution containing from 0.2 to 0.4 per cent. of real soap giving a better result than either a stronger or a weaker one.—Pharm. Journ. and Pharmacist, Nov. 25, 1911, 711; from Chem. Ztg., Sept. 26, 1911, 1027.

Soaps—Disinfecting Power.—W. Scholtz and A. Gelaire show that the irritating effect possessed by many soaps is due solely to the free alkali they contain. The disinfecting power of soaps is found to depend very largely upon the antiseptic action of the soap substance itself, and is not so much dependent upon the quantity of alkali present as has previously been thought. The disinfecting power of albumose soap and green soap against staphylococci is small. The scented soaps have a greater antiseptic power, owing to the presence of the perfume. The bactericidal power of such scents is greater when they are incorporated in the soap than when tested alone. Antiseptic substances, such as sublimate, sublamin, and carbolic acid, lose some of their antiseptic properties when added to a soap.—Pharm. Journ. and Pharmacist, Sept. 24, 1910, 392; from Arch. f. Dermat. u. Syph., Vol. cl, No. 1, through Br. Jour. Dermatol., Aug., 1910, 275.

Soaps—Germicidal and Insecticidal Values.—H. C. Hamilton has studied the germicidal and insecticidal values of different soaps, his results showing that coconut oil soap has the highest value as a germicide. Castor oil and olive oil soaps were the only others tested which had germicidal action in 5 per cent. solution, the others (rape seed oil, whale oil, linseed oil, palm oil, resin oil) scarcely showing even an inhibiting action on the growth of *B. typhosus* in bouillon. The insecticidal values

indicate that no considerable difference exists in the potassium soaps of the different glycerides, a 1 per cent. solution being efficient in every case but one—that of the soap from rape seed oil. The general results of the investigation show (1) that *B. typhosus* is especially susceptible to the germicidal action of alkali (KOH). (2) The combination of soap with an active agent does not invariably enhance the germicidal value of the latter. (3) The germicidal value of the combination of soap and cresylic acid depends on the glyceride used in the manufacture of the soap. One may, therefore, conclude that the soap exerts a distinct influence on the value of this agent. (4) The germicidal value of the alkali is not increased by any combination used in this series of tests; when combined with cresylic acid its value is one-third that of the alkali alone.—Pharm. Journ. and Pharmacist, Oct. 14, 1911, 499; from Journ. Ind. and Eng. Chem. Aug. 1911, 582.

Mercurial Soaps—Suitable Mercury Compounds for their Preparation.—W. Schrauth's experiments have shown that nitrogenous mercurial compounds, such as the albumen compounds of mercury and of mercuric chloride, are decomposed when added to soap in the same way as mercuric chloride itself is. Of organic compounds in which mercury is directly united to carbon, those which are at once darkened by ammonium sulphide are also decomposed by the material of the soap, and only those which are not at all or only very slowly affected by ammonium sulphide are suitable for use in soap. Mercury oxycyanide, which is in great favor in spite of its low disinfecting power, is accordingly not suitable for making a mercurial soap. The best materials are alkali salts of oxymercurial-carboxylic acids, the disinfecting powers of which have been studied by Kronig and Paul. The antiseptic power of sodium oxymercury-benzoate is increased by the presence of halogens, nitro groups, and alkyl or aryl radicals, but is reduced by the introduction of a further acid and group into the benzene nucleus. Hermophyl, the disodium salt of a mercury-substituted phenol-disulphonic acid, possesses little disinfecting power; on the other hand, afridol, which is now on the market as afridol soap, and is the sodium salt of oxymercury-o-toluic acid, is much more active.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 625; from Pharm. Post, Oct. 10, 1911, 836.

Liquid Toilet Soap—Formula.—P. Henry Utech recommends the following formula and process for preparing a liquid toilet soap which he has exploited successfully under the name of *Liquid Aromatic Shampoo Soap*:

Sodium Hydroxide	80 Gm.
Potassium Hydroxide	80 Gm.
Cottonseed Oil	1000 Cc.
Alcohol	500 Cc.
Water, sufficient to make	2500 Cc.

Dissolve the hydroxides in 500 Cc. water; add the alcohol, and finally, the cottonseed oil, in several portions, and shake thoroughly. Allow to stand for several hours, shaking the mixture occasionally, until thoroughly saponified, and finally add sufficient water to make 2500 Cc. of liquid soap. To this soap add: Potassium carbonate, 50 Gm.; terpineol, 12 Cc.; evergreen "A," sufficient to produce a grass-green color. The formula is a modification of one suggested some years ago by Mr. Wilbert.—Proc. Pa. Pharm. Assoc., 1911, 221–223.

SPIRITUS.

Spirit of Nitrous Ether—Extemporaneous Preparation.—In a former paper D. B. Dott suggested the mixing of a strong aqueous solution of sodium nitrite with alcohol containing an equivalent of sulphuric acid, filtering off the sulphate of soda, and washing with alcohol to the proper volume. This method may be useful for preparing a small quantity as required, but it occupies some little time, and the considerable amount of alcohol retained by the sulphate is also an objection. What the author now proposes is that no spirit of nitrous ether should be kept in stock at all. There would be two solutions, like Fehling No. 1 and No. 2, which would be mixed when dispensing, ½ dram of solution of sodium nitrite with 7½ drams of acidified alcohol, to make 1 oz. of spirit of nitrous ether. In order to avoid the formation of a precipitate it is necessary to use an acid which forms a sodium salt soluble in alcohol, and obviously the sodium salt should not have any marked medicinal action in small doses. Further, the acid should not react appreciably with the alcohol, so that a bottle of the acidified spirit could be kept for a reasonable time. The author suggests lactic acid as meeting all the requirements, but there may be a better. It seems to him that this plan of making the preparation at the moment of sale is the only practical way of overcoming what is undoubtedly a serious difficulty.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 422–423.

Spirit of Nitrous Ether—Change in Formula and Cause of Deterioration.—Linwood A. Brown records a series of experiments the results of which lead to the conclusion that the deterioration of spirit of ethyl nitrite is due to a number of contributing causes, chief among which are: (1) Hydrolysis of ethyl nitrite by the water contained in the alcohol used. (2) This change appears to be accelerated by the acid produced during the change. (3) Loss of ethyl nitrite by volatilization. (4) Effect of actinic rays of light on the ethyl nitrite. Therefore, in the author's opinion, in order to produce the best and most efficient preparation it is necessary to use absolute alcohol U. S. P. in place of that now in use, to keep the product at a temperature not greater than 10° C. (50° F.) and to keep the product in as small a container as possible, better in the size package called for by the trade, and to protect it from the light by the use of amber-colored bottles.—Amer. Drugg., October, 1911, 215.

Spirit of Nitrous Ether—Simple Volumetric Assay.—Otto Herting recommends the following simple method of volumetric assay in place of the nitro-metric process of the Pharmacopœia, which requires only a few inexpensive apparatus and is easily and expeditiously carried out: Into a glass-stoppered 100 Cc. flask place 10 Cc. of water and 5 Cc. of cold saturated solution of potassium chlorate (which must be free from chloride); add 5 Cc. of the spirit of nitrous ether to be assayed, then 5 Cc. of 10 per cent. nitric acid, and immediately shake the well closed flask (occasionally) for 30 minutes. Now add 10 Cc. $\frac{N}{10}$ silver nitrate V. S., shake vigorously and, after adding a few drops of ferric ammonium sulphate solution, titrate the excess of silver nitrate with $\frac{N}{10}$ potassium sulpho-cyanide V. S. Each Cc. of $\frac{N}{10}$ silver nitrate solution corresponds to 0.0255 ethyl nitrite. The percentage of ethyl nitrite is ascertained by multiplying the number of Cc. of silver nitrate V. S. solution consumed by this factor (0.0255) and the product by 20. The percentage so ascertained is then corrected by multiplying it by the specific gravity of the spirit examined.—Pharm. Ztg., lvi (1911), No. 42, 423.

Spiritus Aetheris Nitrosi, G. P. V—Identity Reaction.—Dr. R. Gage finds that if the identity test of the G. P. V. for spirit of nitrous ether is conducted in accordance with the official directions, the preliminary mixture of the spirit and sulphuric acid assumes a brown color which prevents or obscures the characteristic brown zone on superimposing a layer of ferrous sulphate solution. The test, however, becomes available if the prescribed reagents are employed in the order recommended in E. Schmidt's Lehrbuch (Organ. Chem., 5th ed., p. 645), which is there described as follows: If 5 Cc. of ferrous sulphate solution and 5 Cc. of concentrated sulphuric acid are mixed and a layer of about 5 Cc. of spirit of nitrous ether is poured on the surface of the hot mixture, a characteristic brown-black zone develops on the point of contact of the two layers. The author finds the identity test of the G. P. IV to be quite satisfactory, although even this may be improved by superimposing the spirit upon a layer of ferrous sulphate solution in 25 per cent. hydrochloric acid, instead of mixing the two liquids and observing the color of the entire mixture.—Apoth. Ztg., xxvi (1911), No. 66, 689.

Spiritus Aetheris Nitrosi, G. P.—Inadequacy of Description and Tests.—K. Enz, recording the results of examination of a series of commercial samples of spirit of nitrous ether, observes that so long as the German Pharmacopœia does not prescribe a volumetric method of determining the percentage of ethyl nitrite, and does not insist, at least, on a minimum content of the ether, the pharmacist is forced to rely solely on his judgments based on the prescribed test. This test, however, as given in the G. P. V., he finds inadequate in the present form, and he suggests some improvements, but regards the test of the G. P. IV—depending on the

brown-black color produced when 2–3 Cc. of spirit of nitrous ether is added to a concentrated solution of ferrous sulphate in hydrochloric acid —to be preferable. In concluding his interesting paper, the author observes, "as in the case of many other preparations it is also shown here that the apothecary by the purchase of such preparations increases his responsibility, whereas he would do better to submit to the trouble of frequently preparing the spirit himself, with the result that in any case his product would be superior to the spirit usually on the market".—Apoth. Ztg. xxvi (1911), No. 68, 717.

Spiritus Aetheris Nitrosi is the subject of a paper by Ewing R. Cocke and C. A. Duncan, in "Proceedings", 1910, 1263–1264.

Aromatic Spirit of Ammonia, B. P—Modification of Formula.—For the preparation of spirit of sal volatile (Spiritus Ammoniae Aromaticus), the B. P. directs that a mixture of alcohol, water, and volatile oils be distilled. E. W. Pollard proposes to avoid the distillation of the alcohol, and suggests the distillation of the oils with water, rejecting certain fractions towards the last, the presence of which would impair delicate aroma. The following process, the author avers, yields a spirit equal in all respects to that prepared by the official process:

Oil of Nutmeg	4½ fl. drachms
Oil of Lemon	6½ fl. drachms
Water	2 pints

Distil 1 pint, mix with 6 pints of alcohol.

Dissolve ammonium carbonate, 4 ozs., in strong solution of ammonia, 8 ozs., and water, 9 ozs., by the aid of gentle heat. Add the solution to the alcoholic solution of the oils.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 408.

Spirits of Volatile Oils—Convenient Method of Assay.—Dr. J. W. Baird describes several methods for determining the amount of volatile oil in alcoholic solutions of them, which depend on the separation of the oil by the addition of water and then centrifuging so as to facilitate the separation. This operation is usually conducted in an apparatus known as the "Babcock Milk Bottle," used commonly for the separation of fat from milk, and consists of a flask of 40 or 50 Cc. capacity, with a long neck graduated to hold 2 Cc., divided into 50 fractions, each $\frac{1}{25}$th Cc. Since a centrifuge is not always available, Dr. Baird suggests that this apparatus can be dispensed with in the following manner: Prepare a nearly saturated solution of salt in water. Place 10 Cc. of the spirit or essence into the milk bottle, add the salt solution up to nearly the neck, agitate some and fill so that the layer of oil is brought within the graduations. Let stand until the oil is clear; warming slightly by setting into warm water for a few minutes will facilitate separation and the oil will

become clear more quickly, but that is not necessary. Simply let it stand. Read the graduations covered by the oil, and multiply by 2. This will be the percent. without any correction and will be quite close to the truth.—The Apothecary, July, 1910, 18–19; Proc. Mass. Pharm. Assoc., 1910.

Bay Rum—Manufacture.—Frederick T. Gordon, who during twenty years service in the navy had abundant opportunity to witness the manufacture of "real" bay rum, says that when it was made by direct distillation from the leaves, the fresh leaves of the bay tree were bruised, put into a still and the still filled with crude rum. This was allowed to macerate over night, and then heat was applied and a liquid containing practically 50 per cent. of alcohol and the essential oil of the bay leaves came over and was collected. This product was the original bay rum, as we knew it. The method has, however, become obsolete; even in the island of St. Thomas, which was once the headquarters of the bay rum industry, little is now made by distillation. It is now usually made by dissolving the volatile oil in the cheap alcohol obtained from the distillates of the sugarcane plantations as a byproduct. The following working formula is suggested by Mr. Gordon as producing an excellent bay rum:

Oil of bay	5 Cc.
Oil of pimenta	1 Cc.
Oil of orange	1 Cc.
Alcohol	400 Cc.
Water	400 Cc.
West India (Santa Cruz) rum	200 Cc.

Dissolve the oils in the alcohol, add the rum, then the water, and, after a few hours, filter. No coloring is needed. Drugg. Circ., April, 1911, 183.

Spiritus Saponatus—Simplified Process of Preparation.—Dr. Ernst Richter recommends the following simplified process for the preparation of spiritus saponatus, using a commercial solution of potassium hydroxide of 47° B., obtained electrolytically: Heat 4.5 kgm. olive oil to 85° C., add 3.75 kgm. alcohol in one portion, then 1.64 kgm. KOH. solution (47° B.), stirring assiduously until saponification results—this requiring about 1½ minutes. The soap is then dissolved in 18.76 kgm. alcohol, 16.35 kgm. water is added, and the mixture is filtered.—Apoth. Ztg. xxv (1910), No. 76, 730.

SUCCI.

Red Currant Juice—Deficiency in Sugar to Produce Wine.—W. H. Kendell records the results of some experiments made in Prof. Edward Kremers' laboratory to determine the adaptability of the pure, unsweetened juice of red currants for the production of a wine. Subjecting the juice obtained by hand-expression to fermentation: (1) by itself; (2)

after the addition of granulated sugar (485 Gm. to make the measure up to 970 Cc.); (3) by the addition of the same quantity of sugar to 100 Cc. of the original juice plus a sufficient amount of second pressing to make 970 Cc.; and (4) by dissolving 485 Gm. of sugar in sufficient washings from the pulp and dishes to make 970 Cc., the quart bottles containing them were left to themselves, with the usual precautions for the escape of carbon dioxide, for 3 months, and then examined. No. 1 had become foul-smelling, disagreeable in taste, and contained less than 1 per cent. of alcohol. Nos. 2 and 3 were palatable preparations, containing somewhat over 8 per cent. of alcohol. No. 4 contained practically all the sugar added, but almost completely inverted, and contained less than 0.5 per cent. of alcohol. Its taste was that of a slightly acidulous fruit juice, with only a faint fruity odor. The analytical figures obtained by a chemical investigation are given in a table appended to this paper.—Midl. Drug. and Pharm. Rev., Sept., 1910, 478–480.

Fortified Lime-Juice—Requirement of the British Revenue Authorities.—The "Chemist and Druggist," commenting on the new rule of the British Revenue authorities affecting the soundness of lime-juice intended for exportation or for use on ships, prints the order recently promulgated, the additions being printed in italics in order that the extent of the new requirements may be realized:

The juice, on approval, *must* be fortified as soon as possible with spirits in the proportion of 15 parts of proof spirits to 85 parts of juice. The spirits must be duly approved by the inspector of the Government Laboratory, or by the officer at the warehouse, and certified on the usual form as proper and palatable for the purposes, and as not under proof. *If the juice remains unfortified for more than fourteen days after the date of its approval the certificate of approval is to be canceled, and a fresh sample drawn from each cask or vat and sent to the inspector of the Government Laboratory for examination and approval before being fortified.* If the juice is declared unfit to be used as ship's stores the officer will call on the proprietor to remove it from the warehouse forthwith. He will also note its rejection in the operation register.—Chem. and Drug., May 13, 1911, 51.

SUPPOSITORIA.

Suppositories—Preparation.—At the Swampscott meeting of the Massachusetts Pharmaceutical Association (1910) Professor La Pierre gave an interesting talk on the subject of suppositories as taught in the Massachusetts College of Pharmacy, in the course of which he makes a number of valuable suggestions that may be consulted with profit in the Proceedings of that Association or in The Apothecary, July, 1910.

SYRUPI.

Syrup—Apparatus for Continuous Manufacture.—Howard Phelps gives

explicit directions for constructing a good home-made percolator for preparing simple syrup, continuously if desired, from a sound 20-gallon keg and a good alcohol barrel, with little aid from outside mechanics, except that of a tinsmith to make the strainer. This, as shown in the accompanying drawing (Fig. 64) is conical in form, rising about 6 inches from the center of the bottom of heavy sheet tin to which it is soldered, and from which descends a small, 3/8-inch spout 3 inches long which passes through the wooden bottom of the keg into the opening in the head of the barrel. The cone, which is constructed of heavy metal sieving, and is fitted accurately into the bottom of the keg (the head of which has been removed

FIG. 64.

Syrup Apparatus.

and is used as a cover) is covered by a piece of cheese-cloth of double thickness, enveloping it completely and held securely by tying the under ends to the spout. The keg (or percolator) being in position, it is filled with sugar to within ten inches of the top, then enough water is added to fill to the top. Water should afterwards only be added with the keg at least half full of sugar, which is supplied from time to time. The percolator-strainer should be cleaned about once a month. In case the percolation is to be stopped for a time, it should be filled to the top with sugar and enough water added to moisten it thoroughly.—Merck's Rep., Aug., 1911, 224.

Syrups—Preservation in an Atmosphere of Alcohol.—Lefeld discussing the problem of preserving syrups in the shelf bottles, observes that, as had been pointed out by others, this is well accomplished by maintaining an atmosphere of alcohol in the containers, and describes the expedients

which he has found to serve this purpose admirably and which are constructed with little expense and trouble, as shown by the accompanying drawings. In Fig. 65 a small, wide-mouth bottle (*a*) is stoppered with a perforated cork (*b*) through which a glass tube (*c*) is inserted: this tube extending to near the bottom of the vial, and protruding sufficiently to penetrate a cork (*e*), which is used as a stopper for the syrup-bottle (*d*), after a little alcohol has been poured into the vial (*a*). An atmosphere

FIG. 65.

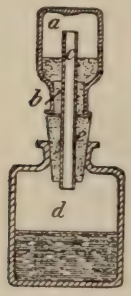
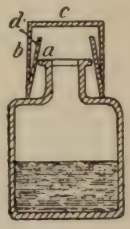


FIG. 66.



Apparatus for Preserving Syrups

of alcohol is thus established, and direct contact of the alcohol with the syrup (by spilling) is practically avoided.

A second expedient is shown by Fig. 66. This consists of a double-walled cylindrical cap, constructed of sheet zinc or tinned iron. The inner mantle (*a*) is soldered to the lower edge of the outer mantle (*b*), and inclines inward to within a short distance of the mantle-cover (*c*), thus forming a receptacle (*d*) for alcohol, which should only be partially filled. The cap may be lacquered or bronzed on the outer surface, and when in position, as shown, looks well and serves the intended purpose admirably. —Pharm. Ztg., lvi (1911), No. 33, 333.

Syrups of the U. S. P.—Comparison with those of the more important foreign Pharmacopœias is made by George M. Beringer in "Proceedings," 1910, 1241–1245.

Pharmacopœial Syrups—Critical Review.—At a meeting of the N. E. Branch of this Association, Mr. C. F. Nixon interestingly reviews and criticises the pharmacopœial syrups. He says if one studies the U. S. P. syrups carefully he will be impressed with the singular lack of uniformity in the formulas for syrups of the same class. He will also be impressed with the unnecessary nicety of some of the processes. An instance of the latter is the process for arriving at the final quantity of 1000 Cc. in most of the formulas. In more than two-thirds of them it is directed to use water to make about 900 Cc.; strain and add water through the strainer to make 1000 Cc. All that is gained by this procedure is the saving of 4

to 6 Cc. of syrup that remains on the strainer. This saving of syrup entails a great loss of time and much inconvenience. Most of the syrups are nearly, or quite, saturated solutions of sugar. By this process it is difficult, and in some cases impossible, to dissolve the last part of the sugar. By adding the full amount of water before dissolving the sugar this difficulty is overcome. If it is thought desirable to wash the filter and save the 4 Cc. of syrup, not more than 15 Cc. should be reserved for the purpose. Regarding sugar, Mr. Nixon says that ordinary granulated sugar does not conform to the requirements of the Pharmacopœia for saccharum, but what is known as Druggists' Sugar probably does very nearly. It has been his practice for fifteen years to use sugar crystals, or rock candy, for making medicinal syrups. It is the purest form of sugar, makes a brilliant syrup with the best of keeping qualities. It may be obtained of various sizes, but what is known as "rice size" rock candy is best adapted to syrup making. If the process of percolation is used it will be found that these larger crystals dissolve faster than does granulated sugar, the latter being so fine that as the water becomes saturated it becomes clogged. Taking up the syrups in their alphabetical order, the author points out some directions in which the formulas and methods should be improved. Thus, as a rule, syrups made from fluidextracts, but made, like syrup of ipecac for example, by diluting the fluidextract with the proper quantity of water, filtering the solution, and dissolving the sugar in the filtrate. For specific details, however, the original paper must be consulted.—The Apothecary, November, 1910, 19–20.

Pharmacopœial Syrups Direct from the Drug—Improved Formulas.—C. A. Duncan and P. D. Dallas give the results of some experiments made to confirm the value of the improved formulas for U. S. P. Syrups suggested by George M. Behringer and George M. Behringer, Jr., (see Proceedings, 1909, 110), selecting the syrups of Ipecac and of Rhubarb for their experiment. They find that excellent syrups are produced by a slight change of the directions. In the case of

Syrup of Ipecac, for example, it was found necessary to macerate the drug for at least twenty-four hours with the menstruum (acetic acid, glycerin and water) before proceeding to the percolation. The drug is then found to be exhausted by the prescribed amount of percolate, the dregs being in the experiment found free from alkaloid, as none was yielded on percolating them with 70 per cent. alcohol.

Syrup of Rhubarb made in the same manner by percolating the rhubarb, previously mixed with clean sand, with glycerin and water after allowing to macerate twenty-four hours, produce a satisfactory syrup. It was found that when allowed to macerate the amount of extractive was increased.—Proc. Texas Pharm. Assoc., 1911, 105–106.

Syrup of Ferrous Iodide.—Modification proposed by William C. Toplin in "Proceedings", 1910, 1258–1259.

Syrup of Iron and Manganese Lactate, Phar. Germ. V—Improved Formula.—F. Music criticizes the formula for syrup of iron and manganese lactate of the Phar. Germ. V, and recommends the following improved formula and manipulation: 24.0 lactic acid and 43.0 boiling hot water are mixed in a capacious Erlenmeyer flask and 10.0 calcium carbonate are gradually added with constant rotation; when the evolution of CO_2 ceases, 22.0 phosphoric acid are added and the liquid is filtered. Then 5.0 iron lactate are dissolved in 70.0 boiling hot water and 1.0 manganese in 35.0 water, and the solutions filtered consecutively into the calcium lactate solution. To the mixed filtrate a cold syrup, prepared by boiling 540.0 sugar with 270.0 water is added, followed by the prescribed quantity of lemon oil, and the weight of the whole is then adjusted to 1000.0.—Pharm. Ztg., lv (1910), No. 83, 838.

Sirop Limo-Citrique—Formula.—M. Jaudon recommends the following formula for making "lemon syrup": Grate 32 fresh lemons on a sufficient quantity of sugar, mix the sugar and grated lemon peel with the expressed juice of the lemons, add 400.0 Gm. of rum, and allow the mixture to stand 48 hours. Now strain and add the strained liquor to a syrup prepared with 12000 Gm. sugar, 6000.0 Gm. water and 300.0 Gm. citric acid. The syrup is at once bottled and preserved in a cool place.—Pharm. Ztg., lvi (1911), No. 89, 900; from Répert. de Pharm., 1911, No. 10.

Syrupus Pini Strobi Compositus—Improved Formula.—John K. Thum states that while the formula for compound white pine syrup of the present N. F. gives a fairly satisfactory preparation, an increase in the amount of alcohol in the menstruum for extracting the crude drug results in a more stable and elegant pharmaceutical compound. The sulphate of morphine should be eliminated in the next revision, as it is in the following formula suggested by the author:

White pine bark (Pinus strobus)	85 Gm.
Wild cherry bark	85 Gm.
Spikenard root	10 Gm.
Balm of Gilead buds	10 Gm.
Sanguinaria root	8 Gm.
Sassafras bark	7 Gm.
Chloroform	6 Cc.
Sugar	750 Gm.
Alcohol, Water, of each sufficient to make	1000 Cc.

Reduce the vegetable drugs to a No. 40 powder, moisten with a menstruum consisting of one volume of alcohol and three volumes of water and macerate for twenty-four hours. Then percolate with the same menstruum until 500 Cc. of tincture has been obtained, with which dissolve the sugar

by percolation; finally, add the chloroform and sufficient water to make 1000 Cc.—Amer. Drugg., April 24, 1911, 241.

Syrup of Raspberries—Limitation of Ash as a Criterion of Quality.—The necessity of a more accurate method of determining the quality of raspberry juice and syrup has been the subject of several papers, in which particular importance is placed on a limitation of ash produced on incineration. Thus Derlin (Pharm. Ztg., 1910, No. 82) finds that the ash content should not be lower than 0.15 per cent., while Wieblitz in a rejoinder (*Ibid.*, No. 86) points out that in his own experience syrups prepared from pure fruit juice contained percentages as low as 0.1135 to 0.1327 per cent. More recently, Dr. Kochs contributes a notable paper in which, basing his opinion on actual experiments with raspberry juices from different sorts of fruit, both wild and cultivated, he expresses the opinion that a lower limit of 0.450 per cent. ash in the juice (equivalent to 0.15 in the syrup) cannot be demanded, since the juice of cultivated raspberries often falls below that. The ash content of wild raspberry juice, on the other hand, is invariably higher, this pointing to a probable degeneration of the cultivated fruit. He does not, however, regard the ash content, be it greater or less, as a sufficient criterion of quality, regarding it as more important to cultivate and select only the sorts derived from stock of ascertained good quality.—Pharm. Ztg., lv (1910), No. 104, 1046.

Syrup of Raspberry—Detection of Foreign Coloring Matter.—Schwikkard points out that the G. P. method of testing for foreign coloring matter in syrup of raspberry, which depends on their solubility in amyl alcohol, is liable to be misleading because the latter acquires a strong rose color with all natural raspberry juices. He therefore recommends the destruction of the natural color by treatment with sodium hydroxide solution before applying the amyl alcohol test.—Pharm. Ztg., lvi (1911), No. 57, 578.

Syrup of Raspberries—Detection of Artificial Coloring Matter.—C. Daubt recommends hydrogen dioxide for the detection of artificial coloring matters in syrup of raspberries. Natural fruit juices are completely decolorized by this reagent within 48 hours, while the artificial coloring matters remain unimpaired.—Pharm. Ztg., lvi (1911), No. 80, 807.

Syrupus Scillae, B. P.—Changes Occurring in the Course of Preparation.—Walter S. Clark observes that in the preparation of syrupus scillae one might expect the following changes to occur: (1) Loss of acid, (2) inversion of sugar, and (3) hydrolysis of the glucosides present. The following experiments show that these expectations are fulfilled in part:

Two experimental batches of syrup were prepared,

(*a*) Containing 95 Gm. of sugar and 50 Cc. of acetum scillae, the whole being finally made up to 185 Gm. (= 108.7 Cc.).

(*b*) Containing 95 Gm. of sugar and 50 Cc. of dilute acetic acid, the whole being finally made up to 145 Gm.

(*c*) At the same time, 50 Cc. of the acetum used in (*a*) was heated under the same conditions of time, temperature, extent of exposed surface, etc.

These batches were then examined as follows:

—	A	B	C	D
Sp. gr. at 15.5° C.	1.3342	1.3267	1.0395	1.0385
Grams of acetic acid per 100 Cc.	1.569	1.969	3.36	3.63
Grams of acid originally taken.	1.67	2.09	3.63	—
Rotation before inversion (200 Mm.)	+96.0°	+66.0°	−5.2°	−5.2°
Rotation after inversion (200 Mm.)	−44.0°	−38.4°	—	−12.6°

Column D gives the results obtained with the original acetum. These results show that during the preparation of the syrup—

1. A loss of about 6 per cent. of acid occurs. The extent of this loss would differ under different conditions.

2. A considerable amount of inversion of the sugar takes place. Thus in the case of the sample (*b*), if no change had taken place during its treatment, the reading before inversion should be +115.6°, and after inversion −38.5°.

3. Judged by the rotation, practically no decomposition of the glucosides takes place.

A comparison of these results with those obtained in the examination of a number of commercial samples shows that much variation exists in this syrup as supplied by different wholesale houses; and, having regard to the potency of squill preparations, their variability calls, in the author's opinion, for some method of standardization.—Chem. & Drug., July 30, 1910, 168.

Syrupus Scillæ Compositus—Improved Formula.—After considerable experimentation, C. A. Duncan and P. D. Dallas found the following formula to produce a beautiful clear compound syrup of squill that has stood for ten months and is free from precipitate or appreciable change:

Fluidextract of squill	80 Cc.
Fluidextract of senega	80 Cc.
Antimony and potassium tartrate	2 Gm.
Glycerin	100 Cc.
Purified talc	20 Gm.
Sugar	750 Gm.
Solution of potassium hydroxide.	
Water, of each a sufficient quantity to make	1000 Cc.

Heat the fluidextract of squill to boiling, strain and exactly neutralize

the product with sufficient solution of potassium hydroxide. Evaporate the fluidextract of senega on a water-bath till reduced to one-third its original volume. When cold mix with the fluidextract of squill and incorporate with the mixture, intimately, the purified talc, add 350 Cc. of water, filter, and pass enough water through the filter to obtain 400 Cc. of clear filtrate. Add to this the antimony and potassium tartrate previously dissolved in 25 Cc. of hot water. To this liquid add the sugar, glycerin and enough water to make the product measure 1000 Cc. Dissolve the sugar by agitation without heat and strain.—Proc. Texas Pharm. Assoc., 1911, 107.

Syrup of Tolu—Manipulation.—Charles E. Meyer describes the following manipulation for making syrup of tolu which in his opinion furnishes a product superior to that obtained by following the official directions: To make 500 Cc. of the syrup, triturate 5 Gm. of magnesium carbonate gradually with 225 Cc. of cold distilled water, transfer to a bottle (preferably wine-bottle shaped), and shake vigorously a few minutes. Now tilt the bottle slightly and carefully add 25 Cc. of tincture of tolu, flowing it slowly down the neck of the bottle on to the mixture of magnesium carbonate and water; cork the bottle; slowly bring the bottle to a horizontal position, holding the same with both hands at the bottom and neck, and slowly tilt from one end to the other, bring back, and continue this tilting motion back and forward. At this stage go slow; avoid haste, and in a few minutes a finely united mixture or emulsion is obtained. The mixture is now filtered—preferably through a filter previously moistened by running a few ounces of alcohol through it. The sugar is then dissolved in the filtrate by a gentle heat, and the syrup adjusted to the proper volume by distilled water run through the filter.—This manipulation is equally adapted to the preparation of syrup of ginger, and also to making mixtures of glycerin, rose water and tincture of benzoin.—Proc. Mo. Pharm. Assoc., 1910, 94.

Syrup of Wild Cherry.—A criticism in favor of a return to the formula of 1890, by H. A. B. Dunning, appears in "Proceedings," 1910, 1128.

TABELLA.

Chocolate-Coated Tablets—Presence of Arsenic in the Coating.—In the course of a systematic analysis of a proprietary remedy consisting of chocolate-coated tablets, H. C. Fuller found considerable quantities of arsenic, the presence of which could not be accounted for because the use as a remedy was not indicated in the disease for which the tablets were recommended. On removing the "chocolate" coating, which was in reality a coating of brown iron oxide, the arsenic was determined in this as a contaminant, the body or mass of the tablet being found free from arsenic after the removal of the coating.—Merck's Rep., July, 1911, 195; from Journ. Indust. and Eng. Chem.

Sugar-Coating of Tablets—General Description of the Process.—Daniel M. Grosh says that while the process and manufacture of compressed tablets is more or less familiar because of the frequent articles which appear from time to time, he has no recollection of ever having seen published any information pertaining to the very important detail of sugar-coating. That the tablet is covered with variously colored sugar is about the extent of general knowledge, except to those intimately connected with this branch of pharmaceutical manufacture. This lacking information the author endeavors to supply in a general description of the process, without going into details or technicalities, in a very interesting paper which should be consulted in the original, since any condensation of the same can only give fragmentary information.—Merck's Rep., July, 1911, 181, 182.

TINCTURA.

Tinctures and Essences—Retrogression of Demand.—H. Haensel's Report directs attention to the gradual retrogression in the demand for tinctures and essences, which becomes more pronounced from year to year in the German practice of medicine as well as on the part of the public.—Pharm. Ztg., lv (1910), No. 86, 869.

Tinctures of the U. S. P. are criticised by Paul J. Waldner in "Proceedings," 1910, 1281-1285.

Tinctures of the more important Pharmacopœias of the world: a comparison by E. Fullerton Cook, in "Proceedings," 1910, 1247–1249.

Tincture of Cantharides—Preparation of Active Product.—As the result of experiments described in detail, E. G. Eberhardt concludes that cantharides can be exhausted by gently heating with a solution of a caustic alkali to convert cantharidin into cantharidate, drying, grinding and extracting with diluted alcohol. The resulting tincture, however, is weak in vesicating power. Exhaustion can also be accomplished by liberating any combined cantharidin present in the drug by means of a suitable acid and then extracting with acetone. The resulting preparation is actively vesicant.—Amer. Journ. Pharm., Oct., 1911, 471–474.

Tincture of Cantharides, its preparation and assay, is the subject of a paper by Wilbur L. Scoville, which appears in "Proceedings," 1910, 1115-1117.

Tincture of Cantharides—Quantitative Estimation of Cantharidin.—Dr. R. Gaze recommends the following new method for the quantitative estimation of cantharidin in tincture of cantharides: 50 Cc. of the tincture, 25 Cc. of water and 1 Cc. of solution of sodium carbonate (1 : 2), are evaporated to dryness on a water-bath; the residue is dissolved in 10 Cc. of water, 2 Cc. of hydrochloric acid (25 per cent.) are added, and the mixture is transferred and rinsed into a separatory funnel, in which it is shaken out consecutively with 10, 5, 5 and 5 Cc. of chloroform. The

chloroformic solution and washings are evaporated to dryness in the flask in which they have been collected, on a water-bath, and finally with the aid of a bellows, and after standing 12 hours the dry residue is washed consecutively with 10, 5, 5 and 5 Cc. of petroleum ether, the fractions being decanted through a small filter. The washed contents of the flask and the filter are allowed to become air-dry, then washed—first with 10 Cc. of water containing one drop of ammonium carbonate solution, followed by pure water—and dried at 50° C. The residue in the flask is now dissolved in a little acetone and the solution filtered through the washed and dried filter into a weighing flask, the flask and filter being washed quantitatively with sufficient acetone. The acetone solution is evaporated at a gentle heat, finally with the aid of bellows, and the brownish-yellow residue in the weighing flask is then heated at 50° C. in the water-oven to constant weight.

The method under certain preliminary modifications is also applicable to the determination of cantharidin in "Oleum Cantharidum," but the details must be consulted in the original paper.—Apoth. Ztg., xxvi (1911), No. 34, 332–333.

Tinctures of Cinchona, G. P. IV—Incomplete Extraction of Alkaloid.—Dr. R. Gaze in the course of an examination of a number of self-prepared tinctures of cinchona—both simple and compound—obtained results which prove the incomplete extraction of the alkaloid of the bark by the official G. P. process, and that prolonged maceration has no influence on the extraction. He cites as an instance a tincture prepared from bark containing 7.58 per cent. of alkaloid. The tincture obtained by 3 days' maceration contained 0.797 per cent. of alkaloid, corresponding to 3.985 per cent. from 100 p. of the bark, and this yield of alkaloid was not increased by prolonging the maceration to 8 days. The press residue then yielded a tincture containing 0.315 per cent. of alkaloid, but a tincture made from the residue from this preparation was found to still contain 0.272 per cent. of alkaloid. Total alkaloid in the 3 tinctures, 1.384 per cent., corresponding to 6.922 per cent. of the bark used.—Apoth. Ztg., xxv (1910), No. 71, 669.

Tinctures of Cinchona—Percolation the Most Efficient Method of Preparation.—H. Frerichs has made comparative experiments on the methods of preparing tinctures of cinchona by the processes of the G. P. IV, the Ital. Pharm., and by percolation. He finds the method of the Ital. Pharm. to yield better results than that of the G. P. IV, which yielded tincture containing only 75 per cent. of the alkaloid contained in the bark employed, but that the method by percolation is better than either of them, not alone for preparing the tinctures of cinchona, but for the preparation of tinctures in general, and in particular those made from hard drugs and drugs rich in extractive. He suggests that the process of maceration be

confined to the preparation of tinctures from such drugs as do not yield stronger tinctures by percolation, and that the G. P. adopt for other tinctures methods of percolation in accordance with these strictures.—Pharm. Ztg., lv (1910), No. 81, 817; from Festschr. z. Hauptvers. des D. A. Ver., 1910.

Tincture of Cudbear—Superiority of the Powdered Pigment as a Coloring Medium.—Henry O. A. Huegel, experimenting with cudbear purchased several years ago and with two samples recently purchased from different houses, obtained infusions by macerating 15 grains of the respective samples in 1 pint of water for 24 hours, which were identical in color. Similar results were obtained with menstrua consisting of 1 part alcohol and 2 parts of water, of water containing ½ fl. oz. of liquor potassa in a pint, and of water containing ½ oz. of diluted hydrochloric acid in a pint. Tincture of cudbear, however, prepared from the same material did not give the same intensity of color when added to water in the corresponding proportions. It gave less color to all preparations when added to them in corresponding amounts, though carefully prepared and the drug practically exhausted of coloring matter. The author concludes: (1) that cudbear is not subject to material variations in tinctorial power; and (2) that it should be added in substance, finely powdered, to the preparation to be colored.—Proc. Mo. Pharm. Assoc., 1910, 69, 70.

Tincture of Gentian—Improved Preparation.—In the course of his studies on the constituents of gentian root and the changes occurring during the process of drying and preservation (see *Gentian* under "Materia Medica"), Bridel has determined that the active constituents of the fresh roots may be preserved without appreciable loss if a rational process of drying is observed. In a further communication the author now points out that the ferment existing in fresh gentian root, being practically unchanged in the properly dried drug, it is liable to exert unfavorable activity on the gentiopicrin if the tincture of gentian is prepared in the ordinary way, and that this ferment should therefore be destroyed by preparing the tincture with *hot* alcohol. A properly prepared tincture of gentian should contain about 1 per cent. of gentiopicrin.—Pharm. Ztg., lvi (1911), No. 54, 544.

Tincture of Guaiac—Action of Some Salts.—A. Sartory's experiments have shown that certain pure salts behave towards tincture of guaiacum as if they contained oxidases, direct or indirect.—Pharm. Journ. and Pharmacist, Oct. 14, 1911; from Journ. de Pharm. et Chim., Sept. 1, 1911, 236.

Tincture of Iodine—Quick and Clean Method of Preparation.—Charles S. Herron recommends the following simple, rapid and cleanly method of preparing tincture of iodine: Introduce a small pledget of cotton into the throat of a funnel, then the resublimed iodine, pack firmly, add the potassium iodide in very fine powder, and again pack firmly. Pass sufficient

alcohol through the funnel to make the required quantity.—Proc. Pa. Pharm. Assoc., 1911, 314.

Tincture of Iodine—Assay of Total Iodine Used in its Preparation.—In order to determine the total iodine originally used in the preparation of tincture of iodine, in other words both the free and the combined iodine, P. Desvignes proposes the following preliminary treatment: 10.0 of the tincture, corresponding to 1.0 iodine, are treated slowly with alcoholic potash until completely discolored, evaporated in platinum on the water-bath and then carefully incinerated. The residue contains all the iodine, both free and combined, originally used, which is then determined in the usual manner.—Pharm. Ztg., lv (1910), No. 55, 556; from Jour. de Pharm. et Chim., 1910, No. 11.

Tincture of Iodine—Method of Avoiding Decomposition for Antiseptic Purposes.—Dr. E. Cronzel says that while the advantages of tincture of iodine for the antiseptic dressing of wounds and the treatment of the skin prior to operation are incontestable, unfortunately it is liable to alteration under the influence of air, light, temperature, and from the evaporation of alcohol. He therefore advises, as an economical means of preserving it for such purposes, that the tincture should be kept on a layer of calcium carbonate, which absorbs the hydriodic acid as it is formed during decomposition. Also, he would advise that the tincture should be prepared, as required, from iodine, which is stored, in a very finely powdered state, in ampoules, each containing 1 Gm. of the metalloid. This quantity of iodine is to be dissolved by shaking in 19 Gm. of 95 per cent. alcohol immediately before use. Two or three minutes suffice to dissolve it. The tincture thus prepared may be diluted *ad libitum* for surgical use. The author remarks that iodine has a special affinity for the skin, and the tissues in general, which is not diminished by alcohol, but is weakened by benzine, chloroform and ether. The practice of freeing the skin from fat before operation is unnecessary.—Pharm. Journ. and Pharmacist, Jan. 14, 1911, 37; from Rép. de Pharm., Dec. 10, 1910, 533.

Tincture of Larkspur (*Tinctura Delphinii*)—*Formula.*—After a critical review of several formulas which have in recent years been suggested for preparing tinctures of larkspur, and his own experimentation, Otto Raubenheimer, whose experience with this tincture covers a period of ten years, arrives at the conclusion: (1), that the ground drug should be employed, never the whole seed, for the extraction; (2), that pure 95 per cent. alcohol and not a weaker menstruum should be used; (3), that either maceration for seven days or percolation will answer; and (4), that the strength of the tincture should be 10 per cent., this being the international agreement for all potent tinctures.—Proc. N. Y. State Pharm. Assoc., 1911, 258–261.

Tincture of Nux Vomica—Quick and Economical Method of Prepara-

tion.—Extract of nux vomica being usually supplied in quantities of *not less* than one ounce, Walter C. Tomczak conceives the economic idea of preparing 1500 Cc. of the tincture, which requires 30 Gm. of the extract (which quantity, however, his 1 oz. of extract does not supply. Rep). His proposed method of preparation, however, merits attention, the more particularly since it is easy to calculate the proportions with any quantity of extract as a basis. It is carried out as follows:

Extract of Nux Vomica	30 Gm.
Washed Gravel	20 Gm.
Alcohol	
Water, of each q. s. ad	1500 Cc.

Mix the extract intimately with the gravel in a mortar with 100 Cc. of a mixture composed of 1125 Cc. of alcohol and 375 Cc. of water, and knead the mass thoroughly with the pestle. Then add the remainder of the menstruum to make 1500 Cc. and filter through a well-covered filter. —Proc. N. Y. State, Pharm. Assoc., 1910, 221–222.

Tincture of Opium, B. P.—Loss of Morphine in the Preparation.—From time to time statements have been made to the effect that in the conversion of opium into extract or tincture a loss of alkaloid results, or, to put the matter with strict accuracy, that the quantity of morphine shown by the official assay of a sample of opium is always greater than the finished product, even when the utmost care has been taken to secure the perfect exhaustion of the drug. E. H. Farr and R. Wright, with the view of testing the accuracy of these statements, have now made experiments on the preparation of the Tincture, which they describe in detail, with results that go to prove that when the official methods are followed throughout there is always a loss of morphine. In seven samples of opium worked upon, this varied between the limits of 0.8 per cent. and 9.0 per cent. of the whole, with an average for the whole series, as shown in the tabulated statements of the results obtained. In the light of these results it is evident that, notwithstanding the amount of careful thought and experimental work which has been devoted to the subject of opium assay, there is still room for a thorough and systematic review of the whole subject. The loss appears to the author to be probably due to occlusion of the alkaloid, rendering the complete extraction by water or alcohol a matter of practical impossibility, or to some other factor or factors which have hitherto escaped recognition.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy) 1911, 392–399.

Deodorized Tincture of Opium—Deodorization with Paraffin.—M. E. Winkler, following the U. S. P. directions to the place where it says: "Shake the mixture frequently and vigorously for 10 minutes with 65 Cc. of purified petroleum benzine," rejects the latter and uses instead one

ounce of paraffin. Heat the aqueous solution of opium to boiling, add the paraffin previously melted, and allow the mixture to cool gradually. When the mixture is cold the paraffin will harden on top. Remove the paraffin and add the required amount of water and alcohol as directed in the U. S. P. He has made deodorized tincture of opium often in this way and each time it has been successful.—Bull. Pharm., Aug., 1910, 343.

Tinctura Opii Camphorata, U. S. P.—Modification of Formula.—Wm. F. Horn expresses the opinion (which has frequently been advanced by others) that the substitution of an equivalent quantity of tincture of opium for the opium at present directed in the U. S. P. formula for camphorated tincture of opium is a distinct advantage, saving time and facilitating manufacture.—Proc. Pa. Pharm. Assoc., 1910; Amer. Journ. Pharm., Feb., 1911, 78.

Tincture of Strophanthus—Proposed Process of Preparation and Assay.—J. Haycock discusses the different methods of assaying strophanthus seeds and the tincture, and recommends the following, which, as applied to the seeds, may also be used for standardizing the tincture:

1. Twenty Gm. of the powdered seeds are percolated with either petroleum ether or ethyl ether, to remove the oil, as it has been proved beyond doubt that neither of these solvents dissolve any appreciable amount of strophanthin.

2. The seeds so treated are percolated with 70 per cent. alcohol until exhausted; the tincture is evaporated to a soft extract at a low temperature, the extract dissolved in 100 Cc. of water and the solution filtered into a separator.

3. Then add to the filtrate 2 Cc. of 25 per cent. H_2SO_4, and shake out the resulting mixture three times with 20 Cc. of ether, to get rid of any trace of oil that might be present.

4. The aqueous solution of the extract, after this treatment, is warmed on a water-bath for one hour at 75° C., whereby the strophanthin is split into strophanthidin and strophanthobiose methyl ether.

5. When cool, the liquid is returned to the separator and shaken out 3 times successively with 10 Cc. of chloroform, which dissolves the strophanthidin, and leaves it on evaporation to a small bulk in a tared dish, crystallization being facilitated by the addition of a little alcohol; it is finally dried below 65° C. and weighed.

The author suggests that the *Tincture of Strophanthus* be made in accordance with the above observations—removing the oil from the seeds, percolating the oil-freed seeds with 70 per cent. alcohol, and adjusting the percolate to a standard of 0.1 per cent w/v strophanthin by the process described. This chemical method of standardization is regarded by the author to be quite as good, if not better, than the present method of physiological assay.—Pharm. Journ. and Pharmacist, April 29, 1911, 553.

Tincture of Vanilla, U. S. P.—Correct Method of Preparation.—Prof. Joseph Feil discusses the various factors involved in the correct production of tincture of vanilla and gives specific directions regarding the selection of the material, its comminution, and the process of extraction by maceration. The factors that must be considered are the following: (1) Get good beans by personal knowledge. (2) Chop finely. (3) Use 50 per cent. alcohol. (4) Sugar is unnecessary. (5) Macerate in a warm place at least three months.—Proc. Ohio State Pharm. Assoc., 1911, 73–74.

Tincture of Vanilla—Improved Manipulation.—Otto Muhlhan says that the present process of the U. S. P. for preparing tincture of vanilla does not exhaust the beans completely. Experiments have shown that the marc obtained by the present process if macerated with another batch of menstruum, yields 500 Cc. more of fairly good tincture. He therefore suggests the following working formula, which he finds gives good result:

Vanilla cut in fine pieces and bruised	10 Gm.
Sugar	200 Gm.
Alcohol	
Water of each q. s.	1000 Cc.

Mix 650 Cc. alcohol with 350 Cc. water. Moisten the Vanilla with 100 Cc. of this mixture and let stand in a well-covered vessel for 12 hours. Transfer to a mortar, add the sugar and reduce to a pulp, then transfer to a bottle and add 750 Cc. of the menstruum, allow to macerate 7 days, then put on a filter and after the liquid portion has run through wash the filter and contents first with the remaining menstruum and then with a mixture of alcohol and water in proportion as first to make 1000 Cc.—The Apothecary, November, 1910, 18.

Tincture of Vanilla—Improved Manipulation.—A. F. Zimmerschied recommends that in making tincture of vanilla, the beans be run through a small meat chopper, using the fine cutting blade; then transfer the fruit to a large mortar and beat it into a pulp with the sugar. Transfer the mass to a large bottle and add all the alcohol and water. Wash the utensils used in the alcohol and water, to save all the vanilla. Macerate with repeated shakings. By using this process, instead of cutting the beans with a knife or scissors, as many do, a much deeper-colored tincture is obtained, and in less than one-fourth the time.—Bull. Pharm., August 1910, 343.

Tincture of Vanilla, U. S. P.—Practical Method of Examination.—E. R. Thome observes that aside from the official formula for tincture of vanilla there are no generally known tests by which its quality can be estimated. In order to carry out its examination therefore it became necessary to prepare in the first place a strictly official tincture to serve

as a basis of comparison. Such a tincture having been prepared from an average quality of bean, he was able to decide upon certain standards as being representatives of a good official tincture :

I. *Specific gravity :* 0.976 to 0.985 at 25° C.

II. *Alcohol percentage :* 56 per cent. to 58 per cent. official alcohol by volume.

III. *Total solid :* 20.75 Gm. to 22.5 Gm. in 100 Cc.

IV. *Vanilla resins :* Identification of nature and quality.

V. *Coloring matter :* Detection if artificial.

VI. *Methyl alcohol :* Detection if present.

The several processes for these determinations are described in detail. —Merck's Rep., July, 1910, 185–186.

TROCHISCI.

Troches—Additions and Deletions.—Dr. Philemon E. Hommel believes that physicians should order troches more than they do, as they are an efficient and elegant way to administer many remedials. Of the troches at present official, those of santonin, potassium chlorate, ammonium chloride, tannin, cubebs, opium and licorice are about all that are prescribed or called for by the public. He thinks the troches of ammonium chloride, cubebs, and opium and licorice should be eliminated, and a suitable lozenge combining these drugs introduced. Troches of krameria and gambir should be removed, as the troches of tannic acid take their place. Troches of sodium bicarbonate should be replaced by a tablet of sodium bicarbonate with a carminative base. Troches of ginger of the U. S. P., 1880, should be improved and added to the next list. Other additions suggested are : Troches of elm, of guaiac, of gelatine, of red gum, of quinine tannate, of sulphur and cream of tartar, and a laxative lozenge containing senna, cascara and licorice.—Proc. N. J. Pharm. Assoc., 1910, 52–53.

UNGUENTA.

Ointments of the U. S. P—Suggestions for the Revision.—In a paper read before the Medico-Pharmaceutical Section of the Academy of Medicine of Cleveland, Lewis C. Hopp offers some suggestions pertinent to the Ointments of the U. S. P. He approves the condensation of cerates and ointments under one heading, as ointments. If it is thought best to have two bases in the Pharmacopœia, they might be designated as hard and soft, and that a number of bases be adopted : petrolatum and lanolin ; lard or benzoinated lard ; lard and wax ; lanolin ; oil of almonds, spermaceti and wax. He particularizes the ointments for which these several bases are most suitable. In many cases no change of the base at present in use will be required, such for example as aquæ rosæ, belladonnæ, chrysarobini, diachylon, gallæ, hydrargyri nitratis, iodi, iodoformi, picris, potassii iodidi, stramonii, sulphuris, veratrini, zinci oxidi. The strength of the mercuric

oxide ointments, both the yellow and the red, should be reduced from 10 per cent. to 1 per cent., so as conform to the uses for which they are generally prescribed.—Pract. Drugg., June, 1911, 35.

B. P. Ointment—Classification and Critical Review of Basic Constituents.—In a comprehensive report submitted to the Therapeutic Committee of the B. M. A., Dr. R. B. Wild classifies the forty-five ointments of the B. P. as follows: (1) Protection; (2) emollient; (3) absorbent; (4) sedative and astringent; (5) stimulant; (6) irritant; and (7) parasiticidal; the properties of the first three classes depending on the base used, and of the last four on the medicament incorporated therewith. The melting-points of the various bases, as determined by experiment and as given in the British Pharmacopœia, are tabulated. Soft paraffin provides the most notable variation in regard to melting-point, and it is stated that there would be a decided gain in uniformity of product if the melting-point of soft paraffin were brought within narrower limits, or, failing that, if two varieties were allowed melting at 31°–34° C. and 37°–40° C. Dr. Wild remarks that apparently those substances which soften gradually at temperatures considerably below their melting-point are more useful as bases than those which retain their solidity until the melting-point is approached and then liquefy rapidly. Experiments were made with different bases, and where suitable the ointments were used clinically. The relative protective power of the ointment-bases, and also of the absorption of ointments by the skin, were determined by rubbing weighed quantities of the ointment (usually 10 grains) into a definite area of skin (usually 20 sq. in.) for a fixed time, after which the ointment is scraped off the surface of the skin and off the rubbing finger, and re-weighed. The usually accepted views are confirmed, as is apparent in the following statements: "Soft paraffin and paraffin-ointment appear to be hardly absorbed at all, but remain on the skin as a protective layer for a considerable period. Lard and olive oil absorbed to a considerable extent, about 15 per cent. after two minutes' rubbing; hydrous wool-fat, 20 per cent., provided the proper amount of water is present; old samples partially dried are less absorbed. Owing to its powerful adhesive properties no reliable result was obtained from anhydrous wool-fat. The greatest loss of weight occurred from a mixture of equal parts of glycerin of starch and hydrous wool-fat, which is a useful base when a comparatively non-greasy emollient is required." Some useful notes are appended regarding the properties of the classes of ointments, and suggestions are made for the revision of the individual ointments.—Chem. L Drug, July 29, 1911, 144; from "Brit. Med. Journ."

Ointments—Qualitative and Quantitative Analysis.—C. Braubach communicates a lengthy paper on the qualitative and quantitative analysis of ointments and similar preparations. These operations are generally entrusted to the analyst for the purpose of ascertaining the formula and of

duplicating the original. An investigation concerning the correctness of a published formula of such preparations is rarely the purpose of the analysis and is more difficult. A systematic arrangement of how to proceed with the analysis which can be used for all cases naturally can not be given and must be worked out after making some preliminary and qualitative tests, but the following procedure is suggested: (1) Physical examination, color, odor, consistence, taste; (2) microscopic examination; (3) preliminary tests; (4) analysis, qualitative and quantitative; (5) if indicated, preparation of a duplicate and comparison with the original. These several subjects are discussed at great length by the author, who makes valuable suggestions regarding the necessary operations involved.—Amer. Journ. Pharm., July, 1910, 314–327.

Ointments—Methods of Examination.—C. Braubach communicates the results of comprehensive studies undertaken to devise methods for the examination of the numerous ointments and similar specialties met with on the market, with particular reference to the various components that are claimed to be present in them. The paper does not admit of condensation, and must be referred to in the original, in Pharm. Ztg., lvi (1910), Nos. 67 and 68.

Ointments—Advantage of Collapsible Tubes.—A correspondent, "B," directs attention to the advantage of collapsible tubes over the jars heretofore exclusively used for dispensing ointments, crèmes, etc.—The filling of such tubes by means of modern appliances provided for the purpose, no longer presents any difficulty, while as a means of protection from the air, light and dust, not to speak of convenience in use, the collapsible tube fills every requirement far better than is possible when the ordinary ointments jars are used. Pharm. Ztg., lv (1910), No. 86, 869.

Ung. Hydrargyri Nitratis, U. S. P.—Method of Assay.—T. V. Stanislaus and E. Arthur Eaton propose the following method for assaying ointment of mercuric nitrate: To about 3 Gm. of the ointment, accurately weighed in a beaker, a solution of 3 Gm. of potassium hydroxide in 35 Cc. of water is added, the mixture is heated upon the water-bath until saponification is completed, and then allowed to stand 24 to 48 hours for the complete subsidence of the mercuric oxides. The mixture is then filtered (the filtrate being reserved to ascertain if any further deposit is formed), the precipitate on the filter is well washed, and transferred with the filter into an Erlenmeyer flask. Now 50 Cc. of nitrohydrochloric acid is added and occasionally shaken until solution is complete, the solution is diluted with 50 Cc. of water, and the paper removed by filtration and well washed. Filtrate and washings are evaporated to dryness in a capsule, the residue of mercuric chloride dissolved in 100 Cc. of water by the aid of heat, and the solution saturated with sulphuretted hydrogen; the precipitated mercuric sulphide is collected on a filter, well washed, and transferred, paper

and all, into a q. s. bottle; 30 Cc. of $\frac{N}{10}$ iodine solution and 5 Cc. carbon disulphide are added, the bottle is shaken for 5 minutes, allowed to stand half and hour, and the excess of iodine then titrated with $\frac{N}{10}$ sodium thiosulphate V. S. The figures, easily obtained by calculation, will give the percentage of mercury in the ointment within a limit of error of about 0.13 per cent.—Proc. Pa. Pharm. Assoc., 1910; Amer. Journ. Pharm., Febr., 1911, 78.

Ung. Hydrarg. Oxyd. Flav.—Preparation.—M. J. Romeyer states that the following method yields a yellow oxide of mercury ointment satisfactorily conforming to all requirements: Using a porcelain mortar and porcelain or glass pestle, all these carefully cleansed with hydrochloric acid and distilled water and well dried, 5.0 hydrarg. oxydat. flav. and 15.0 lanolin. anhydric are intimately triturated with the aid of the heat of a water-bath. The reddening of the mercuric oxide under the influence of the heating disappears completely on cooling. This mixture is finally incorporated with 80.0 vaselin. alb., 10.0 or more of which may be replaced in winter by ol. vaselin. pur. The product possesses permanent stability and is free from all side-effects.—Pharm. Ztg., lvi (1914), No. 54; from L'Union pharm. 1911, No. 50.

Mercurial Ointment—Preparation.—Ceppelin recommends the following method for the rapid extinction of mercury globules:—100.0 of mercury are quickly triturated in a porcelain mortar with 5.0 of ether, then vigorously and assiduously with 10.0 glycerin. The complete extinction of the metallic globules results rapidly, and the uniformly ash-grey mass may then be incorporated in the usual way with 90.0 of the ointment base.—Pharm. Ztg., lvi (1911), No. 54, 545.

Mercurial Ointment—Determination of Mercury.—Mr. B. Cowie recommends the following method for the determination of mercury in mercurial preparations, which is a modification of Crew's method (see Proceedings 1909, 119), and as applied to mercurial ointment is as follows: —About 10 Gm. of the preparation is weighed in a suitable wide-mouthed flask, mixed with 200 Cc. $\frac{N}{2}$ KOH (alcoholic), and boiled under a reflux condenser until the mercury is precipitated (using a reducer if necessary, such as formaldehyde). The soap solution is decanted, and the precipitated mercury washed with water, which is run through asbestos wool to prevent loss of mercury. The wool is returned to the flask containing the mercury, which is now dissolved in 5 Cc. HNO_3 (1.42). The solution is made to 100 Cc., 20 Cc. are placed in a white basin, mixed with a few Cc. of a ferric solution, and KSCN solution of known concentration run in until the red color appears.

The reaction takes place according to the following equation:

$$Hg_2NO_3 + 2KSCN = Hg_2SCN + 2KNO_3$$

The end-reaction is very sharp in presence of excess of HNO_3 or NH_4NO_3.—Pharm. Journ. and Pharmacist, Dec. 30, 1911, 885.

Ung. Ichthyoli Co.—Formula.—Milton R. Dunn recommends the following formula for compound ichthyol ointment:

Alum Co.:		
Alum	.4	
Boric Acid	3.0	
Salicylic Acid	.6	
	=	4. Gm.
Phenol		2. "
Ichthyol		4. "
Zinc Oxide		10. "
Oil Pine Needles		1. "
Petrolatum		40. "
Hydrous Wool Fat		40. "

Make a smooth ointment of the zinc oxide and petrolatum and of the phenol, ichthyol and oil with the wool-fat, then mix the two and incorporate the alum co.—The Apothecary, October, 1910, 18.

Unguentum Paraffini, B. P.—Preparation with Liquid and Hard Paraffins.—Robert Dunlop reports the results of experiments undertaken to determine the suitability of making paraffin ointment with liquid and hard paraffin. Using 4 parts of "Paraffinum Durum" (m. p. 56° C.) and 6 parts (by weight) of "Paraffinum Liquidum" (sp. gr. 0.880), a plastic ointment of about the official consistence, but granular and "crumbly" or mealy was obtained. The addition of 3 minims of oleum ricini to each ounce corrected the mealiness, but there was still the want of homogeneousness. If, however, 5 per cent. of adeps lanæ was added instead of castor oil, a homogeneous plastic product was obtained.—Pharm. Journ. and Pharmacist, Sept. 24, 1910, 388.

Unguentum Phenolis—Improved Formula.—Otto Muhlhan finds white petrolatum alone unsatisfactory as a base for carbolic ointment. The phenol is not absorbed by the petrolatum and separates out in time. Also the ointment is too soft. The following formula is suggested:

Phenol	3.0 Gm.
Ointment	50.0 Gm.
White petrolatum	47.0 Gm.

To the melted ointment add the petrolatum and then the melted phenol, stir until it congeals.

The benzoinated lard in the ointment absorbs the phenol and the white wax (10 per cent.) gives the finished ointment a better consistency.—The Apothecary, November, 1910, 18.

Unguentum Resorcini Compositum—N. F. Deletion of Water from the Composition.—In the belief that the water in the hydrous woolfat directed in the formula for compound ointment of resorcin is the cause of its eventual discoloration—the water dissolving the resorcin, which in turn

exerts some action on the oil of cade—William Dulin recommends that the hydrous woolfat be replaced by the anhydrous product.—Proc. Pa. Pharm. Assoc. 1910; Amer. Journ. Pharm. Febr., 1911, 77.

Unguentum Resorcinum Compositum—Improved Formula.—John K. Thum recommends the substitution of anhydrous woolfat for the hydrous woolfat now prescribed in the N. F., formula for compound resorcin ointment, as recently suggested by Wm. Durbin, and also to replace the paraffin with an equivalent amount of yellow wax. The resulting ointment is very satisfactory. The method of manipulation is also different from that directed in the National Formulary:

Resorcinol	6 Gm.
Zinc oxide	6 Gm.
Bismuth subnitrate	6 Gm.
Oil of cade	12 Gm.
Yellow wax	10 Gm.
Petrolatum	25 Gm.
Anhydrous woolfat	35 Gm.

Triturate the resorcinol, zinc oxide and the bismuth subnitrate with the anhydrous woolfat until the mixture is perfectly smooth. Incorporate this with the yellow wax and petrolatum, previously melted together, and continue to warm with a gentle heat until the mixture is homogeneous; then remove from heat and when it commences to become firm add the oil of cade and mix intimately.—Amer. Drugg., April 24, 1911, 241.

Antiseptic Salve—New Formula.—Monteil prepares a new antiseptic salve according to the following formula: Antipyrin, 188.0; resorcin, 110.0; terpinhydrate, 180.0. Melt together on an oil bath at 125°, and allow to cool; then dissolve 1 part of the glassy mass obtained in 2 parts of glycerin. The product so obtained has the consistency of glycerite of starch and the appearance of freshly-prepared cold cream. It is claimed to be antiseptic, anodyne and hemostatic.—Pharm. Ztg., lv (1910), No. 55, 566; from N. D. Med. Wschr., 1910, No. 24.

Salicylic Acid Ointments—Method of Incorporation.—Wm. Burton Spire having experienced a difficulty in incorporating salicylic acid in ointments without causing a pinkish discoloration notwithstanding the careful exclusion of iron implements and utensils, finally found that if the salicylic acid is rubbed up with a small quantity of liquid petrolatum, it may be incorporated with the other ingredients of the ointment, even by the use of metal spatulas, without the production of a pinkish discoloration.—Bull. Pharm., December, 1910, 515.

White Precipitate Ointment—Method of Analysis.—After a preliminary description of the composition of white precipitate and the estimation of the mercury content, G. D. Elsdon describes the following analytical process for the analysis of "white precipitate ointment" which he considers

less tedious and an improvement on the several methods that have been hitherto described, remarking that the chief difficulty is the separation of the inorganic material from the fatty basis :—"About 2 grams of the well-mixed ointment is weighed out into an ordinary glass funnel (about 3 Cm. diameter) having its stem cut off to about 1 Cm. long. The funnel is then placed in the neck of a small separator (about 70 Cc. capacity) having a very short stem. The whole is then supported in a thick glass beaker and placed in the steam-oven, where in a short time the ointment melts and runs through into the separator. The ointment remaining in the funnel is then washed into the separator with 20 Cc. boiling roughly normal HCl, 10 Cc. boiling petrol, and 10 Cc. more of roughly normal HCl in succession, the stopper inserted, and the whole well shaken. On standing, separation is almost immediate, the white precipitate dissolving in the HCl and the paraffin in the upper layer of petrol. The lower layer is then carefully drawn off and the stem of the separator washed with water, the washings being added to the separated liquid. The petrol solution is then washed in the separator with a further 20 Cc. of boiling roughly normal HCl—which may be poured through the funnel if the previous treatments have not removed all the ointment from it ; this is separated and added to the previous extract. Practically the whole of the mercury can be removed in the first separation if care be taken, but a further washing is desirable. In case of doubt a third washing should be made and tested for mercury separately. The mixed extracts are then cooled and filtered from particles of fat, the filter being washed well with water and the washings added to the filtrate, diluted to about 400 Cc. and H_2S gas passed to saturation. The precipitated HgS is then estimated by means of the Gooch crucible in the ordinary way. In calculating the NH_2HgCl from the HgS it is advisable to take NH_2HgCl as containing 77 per cent. of mercury in order to allow for the variability of commercial samples."

As a rapid distinguishing test for the ointment base used, treatment with concentrated sulphuric acid has proved most successful. About 5 Gm. of the ointment is placed in a small beaker (40 Cc.), about 20 Cc. of strong sulphuric acid poured on, and the whole gently warmed by putting on the top of the water-oven. In the case of all bases, with the exception of white paraffin ointment, charring takes place at once, while in this case no immediate charring takes place, and very little on warming. The use of carelessly purified soft paraffin also becomes evident, as much more charring takes place with yellow soft paraffin than with white paraffin. On cooling, these differences become even more marked. In the case of ointment made with a paraffin base a cake is found on the top ; almost white for white paraffin ointment, brown to black for yellow paraffin ointment, while in the case of ointment made with other bases no such cake is found.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 445–451.

Benzoated Cold Cream—Formula.—F. Boettger recommends the addition of benzoic acid to cold cream to overcome the tendency of these products to become malodorous on keeping. The following is his formula:

White wax (best)	2 ounces.
Neutral oil (white)	8 ounces.
Powdered borax	54 grains.
Benzoic acid	10 grains.
Water (hot)	3 ounces.

Melt the wax in the neutral oil over a slow heat or water-bath, and when clear but not hotter than is comfortable to the finger immersed in it, add the water containing the borax and benzoic acid previously dissolved and brought to the same temperature; pour in a thin stream into the former, stirring assiduously, shut off the heat, and stir until a white creamy emulsion results; lastly add perfume. If firmer cream is wanted use more wax. Neutral oil is also called petrolatum oil.—Bull. Pharm., Jan., 1911, 33.

"Greaseless" Cold Cream—Formulas.—H. B. Molyneaux gives the following formulas for "greaseless" cold cream, which when the directions are carefully followed will yield satisfactory products:

Formula No. 1.—This is one of the best formulas in the emulsion line of preparation:

Stearic acid	36 ounces av.
White hydrocarbon oil	16 ounces av.
Powdered borax	1 ounce av.
Caustic potassa	1¼ ounces av.
Distilled water	172 ounces av.
Perfume to suit	q. s.

Melt the stearic acid on a water-bath, and when melted, add the oil. Dissolve the potassa in half the water and bring to the same degree of heat as the acid-oil solution. To the oil solution slowly add the caustic solution, stirring all the while until thoroughly saponified. Dissolve the borax in the remainder of the water and gradually add to the saponified mixture, continuing the heat until a perfectly uniform solution results. Remove from the water-bath and stir until cold.

Formula No. 2.—This is in the author's opinion an ideal method, but he insists upon the necessity of following the modus operandi to the letter. One of the first steps in this operation is the use of a granite-ware kettle of from 6 to 8 gallons in capacity for making the quantity contained in this formula. Weigh out accurately:

Stearic acid	3 pounds.
Powdered borax	24 ounces av.
Monohydrated carbonate of soda	1¾ ounces av.
Glycerin	1½ pounds.
Distilled water	18 pounds.
Perfume to suit	q. s.

Weigh the water, glycerin, borax, and soda into a suitable vessel and cause solution by heating on a water or steam-bath. When heated to the boiling point on the water-bath, gradually add the stearic acid, which has been previously granulated, stirring constantly during the operation.

Boiling distilled water should be added from time to time during the process to make up the loss by evaporation.

Formulas for Perfume suitable for these cold creams are given as follows:

Formula No. 1.

Liquid Aubepine	4 ounces.
Concrete oil of orris	1 ounce.
Borvordial, 10 p r cent.	⅛ ounce.
Oil of rose geranium, African	½ ounce.
Benzyl acetate	1 ounce.
Alcohol, deodorized	9⅜ ounces.

Formula No. 2.

Muguet royal	8 ounces.
Otto rose	¼ ounce.
Otto jasmine, "Bush"	½ ounce.
Oil of ylang-ylang	1 ounce.
Artificial musk, 100 per cent	¼ ounce.
Alcohol, deodorized	6 ounces.

The author regards a desirable perfume very essential in these preparations and finds these two to be very excellent formulas for perfume bases that are especially adapted to cold creams.—Bull. Pharm., March, 1911, 106–109.

Greaseless Creams—Formulas.—Edwin B. Curtis says that in recent years there has been an ever-increasing demand for skin creams which would be free from the greasiness of the usual type of cold cream. The greaseless variety that seems to be most prevalent in the market is a sodium stearate cream, this being the least expensive and easiest to manufacture. He has examined a number of creams of the market and on the basis of this examination has constructed the following formulas, which he submits as yielding satisfactory products:

I.

Stearic acid	180 grains.
Sodium carbonate	48 grains.
Borax	3.5 grains.
Glycerin	6 drachms.
Lilac oil	8 minims.
Alcohol	1 drachm.
Water	8 ounces.

Put the acid, carbonate, borax, glycerin and water in a capsule on a water-bath, heat until effervescence ceases. Then add the perfume dis-

solved in the alcohol and beat with an egg beater until cold. This gives a light, fluffy, pearly white cream.

II.

Stearic acid	10	Gm.
Cacao butter	1	Gm.
Sodium carbonate	4	Gm.
Borax	.4	Gm.
Glycerin	8	Cc.
Oil of bitter almond	1	drop.
Oil of rose	5	drops.
Alcohol	6	Cc.
Water	80	Cc.

Heat the acid, carbonate, cacao butter, borax and glycerin on a water-bath until effervescence ceases, discontinue heat and as mixture congeals add the alcohol, in which the oils have been dissolved, warm again and, while cooling, beat vigorously. Hydrogen dioxide may be added for its bleaching effect.

A disadvantage of this type of cream is its proneness to fall or shrink on keeping. This may be overcome by the addition of a small amount of grease such as cacao butter, almond oil or paraffin. Another substance used to overcome this fault is mucilage of tragacanth, the idea being to coat the particles, thus keeping them from contact with the air. If the cream is kept in jars a coating of paraffin on top will prevent evaporation. —Amer. Drugg., Aug. 22, 1910, 103.

VINA.

Pepsin wine, G. P.—Rational Method of Preparation.—Dr. Joseph Herb points out that the spontaneous turbidity of pepsin wine made by the G. B. formula is due to the presence of tannin and other constituents of the wine directed for its preparation. Manufacturers now supply this wine in a permanently clear form, but noticeably of a lighter color. He conjectured that such wines were not prepared with natural wine, but with a dilution of French brandy, and experiments made have convinced him of the correctness of this conjecture. Such a preparation, for example, is the so-called "essence of pepsin" of American Pharmacy, which has all the characters of a good pepsin wine, excelling however by permanent brightness. Further, his experiments have led him to adopt and recommend, the following formula and process:

Spir. Vini gallici (50 per cent. alcohol)	250 Cc.
Glycerin	500 Cc.
Pepsin (1:3000)	30 Gm.
Acid Muriatic (31.9 per cent.)	8 Gm.
Aq. dest. q. s. ad	2500 Cc.

Mix the brandy with 750 Cc. of water and add 30 Gm. of skim-milk,

whereby the casein is coagulated in fine flocks, carrying down the coloring substances (tannin-like bodies and caramel) of the brandy. The mixture is well shaken and filtered, forming readily a straw-yellow, nearly colorless liquid. The pepsin, dissolved in 750 Cc. of water (not filtered) is added to the filtrate, the glycerin is added, followed by the muriatic acid, previously diluted with 250 Cc. of water, and sufficient water to make 2500 Cc. of liquid. This mixture is then well mixed with a magma of white filter paper, finely pulped, and filtered through a white paper filter. The filtration proceeds rapidly and efficiently, and the product is faultless if these simple directions are carefully observed.—Pharm. Ztg., lv (1910), No. 54, 549–550.

MISCELLANEOUS SUBJECTS.

Diabetic Foods—Experimental Inquiry into the Composition Claimed.—Twelve different samples of gluten bread and flours, the product of seven manufacturers, were examined by F. W. F. Arnaud, who found that the products of one manufacturer alone can be said to be satisfactory. The advertising matter issued by many of these firms is of interest: one firm submits that its products are more nutritious than any other preparat on of the kind; again, a statement advertised very generally is to the effect that the starch present in the foods has been altered by special methods, and exists in a modified form so that it can be digested and assimilated by the diabetic subject. The statement that the starch is appreciably altered cannot be confirmed either by the qualitative iodine test or the microscope. A sample of an expensive diabetic food was found to consist of ordinary flour which had merely been heated. From the results of his analyses, which are given in a table, the author concluded that steps should be taken for the repression of the business carried on in the sale of ordinary bread and flour as specially recommended diabetic foodstuffs, or the composition of these foodstuffs should be declared to the purchaser.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 433–434.

Yoghurt—Preparation.— Dr. H. Kühl contributes a lengthy paper describing the properties and preparation of the Bulgarian milk food known as "yoghurt" (also "jaurt") which is receiving considerable attention in recent years, and was described in the "report" of last year (see Proceedings 1910, 390). The author does not add much to the description there given, but gives some practical details respecting its preparation which may be of supplementary interest. He says that of the three bacilli that are concerned in the production of yoghurt from milk, the one of most importance is *Bacillus bulgaricus*, since it is principally concerned in the peculiar acidification that characterizes this preparation, the other two (*Bacterium lactis acidi* Günthers and a lactic acid *Streptococcus*) serving mainly the purpose of modifying the taste and preparing the milk for acidification. To prepare the thin-liquid yoghurt, which is preferred

to the thick yoghurt used in the Balkan states, good, fresh milk is subjected to brief boiling and then allowed to cool to 45° C., whereupon it is at once inoculated with some old yoghurt or, if this is not available, with a yoghurt culture, which must be well mixed with the milk. It is then allowed to stand at a temperature of about 40° C., observing that the temperature does not fall below 35° C., at which temperature the growth of the *Bacillus bulgaricus* ceases. When the milk shows signs of thickening—usually after three to five hours—the vessel is transferred to a cool place, and the yoghurt is then ready for use, retaining its good quality and taste several days. To assure its proper quality an experiment is made with a fresh portion of milk, inoculated with some of the yoghurt just prepared.—Pharm. Ztg., lvi (1911), No. 45, 454; from Südd. Apoth. Ztg., 1911, No. 43.

Gray's Glycerin Tonic Compound: Original Formula is the subject of a paper by P. Henry Utech, in "Proceedings," 1910, 1262, 1263.

Marking Ink—Economical Formula.—A. Ballard states that the following ink has given good results in marking military hose and leather articles for the French army: Ferric acetate, crude, 500; ferrous sulphate, 100; gum arabic, 50; tannin, 10; water, 500. Dissolve separately the ferrous sulphate and the gum in 200 of water and the tannin in 50; mix the ferrous sulphate solution with the ferric acetate, then add the tannin, and finally the gum.—Pharm. Journ. and Pharm., Oct. 14, 1911, 494; from L'Union Pharm., August 15, 1911, 363.

Disinfectants—Bacteriological Testing and Standardization.—At the forty-seventh annual meeting of the British Pharmaceutical Conference (1910) several interesting papers were read and discussed at length on the bacteriological testing and standardization of disinfectants. Prof. Sims Woodhead read a paper by Dr. Constant Ponder and himself on the "*bacteriological standardization of disinfectants*," in which the authors fall back on a comparative valuation of disinfectants, taking phenol as their standard, and using a modification of the Rideal-Walker drop method, as giving promise in theory of the most precise results. They discuss the following factors: Organisms to be acted upon; number of micro-organisms and amount of organic matter to be added; strength and number of dilutions; time during which the disinfectant is allowed to act; temperature. Professor R. Tanner Hewlett read a paper on the "*Woodhead-Ponder method of disinfectants*" (above outlined), in which he questions the necessity of "seeding" the sub-cultures with more than a standard loopful. He thinks that the use of *Bacillus coli* instead of *B. typhosus* is probably a desirable change, although this depends on further investigation. C. T. Kingsett read a paper by R. C. Woodcock and himself on the subject of "*bacteriological testing of certain disinfectants and the results as affected by varying conditions*, dealing mainly with commercial dis-

infectants of the coal-tar order, classifying them into "Emulsified Disinfectants" and "Homogeneous Disinfectants." The normal Rideal-Walker coefficients in respect of *Bacillus typhosus* were first determined, then the normal coefficients with regard to other germs, the influences of higher temperature as affecting the *B. typhosus* co-efficient, and an extension of time, simply or coupled with a higher temperature. The results are tabulated for purposes of ready comparison, and they appear to show that while the R.-W. test may very well serve to determine the relative germicidal values of similarly prepared preparations of a coal-tar nature, it is not applicable for ascertaining the real or relative values of other disinfectants of a different chemical nature.—Trans. Br. Pharm. Conf. (Yearbook of Pharmacy), 1910, 329–362.

D. New Remedies and Trade-Named Preparations.

Abortin is the trade name of a veterinary preparation obtained in a manner similar to tuberculin preparations, which is employed in cases of infectious miscarriage of cows. According to Bang this infectious abortion is incited by the presence of a bacillus.—D. Med. Wschr., 1910, No. 33.

Achibromin is the trade name given to "monobromisovalerianoglycolylurea," which is obtained in form of pearly-glistening scales, melting at 150°–152° C. when crystallized from diluted alcohol, and containing approximately the theoretical percentage (28.5 per cent.) of bromine. This specialty is recommended as a nerve sedative and hypnotic in doses varying from 0.3 to 0.4 Gm., three to four times daily, to 0.5–0.8 Gm. before retiring.

Acijodin is the corresponding iodine compound, in which the bromine is replaced by iodine. This also crystallizes in small scales and melts at 150° C. It is recommended as a substitute for the ordinary iodine preparation, over which it has the advantage of combining the nerve-sedative action of valerianic acid. The dose is 0.3 to 0.4 Gm. three times daily. Both preparations are supplied in tablets of 0.35 Gm. each, as well as in bulk.—Pharm. Zentralh., lii (1911), No. 13, 342.

Adalin is the trade name given to "bromdiaethylacetylurea", which is recommended as sedative and mild hypnotic remedy. It is supplied in form of a colorless, nearly tasteless, crystalline powder; m. p. 115°–116° C.; sparingly soluble (0.05 per cent.) in cold water, more soluble in hot water, and freely soluble in alcohol, acetone, and benzol. It is difficultly soluble in petroleum-ether. Adalin is slowly decomposed by boiling with water, and is split up with evolution of ammonia by sodium hydroxide solution, which readily dissolves it.—Pharm. Ztg. lv (1910), No. 102, 1028.

Adalin has been subjected to clinical study by Dr. Scheidemantel, who pronounces it as being indicated in conditions in which the administration of bromine is desirable in conjunction with a pronounced sedative effect

and the avoidance of the preliminary use of strong hypnotics. In this respect it occupies an intermediate position between the groups of simple sedatives and pure hypnotics, the value of which is the more important since in the modern materia medica there are comparatively few remedial agents that reliably exert an intermediate degree of activity.—Pharm. Ztg. lvi (1911), No. 25, 254: from Münch. Med. Wschr. 1911, No. 8.

Afridol soap is the name given to a soap containing 4 per cent. Mercuri-o-toluyl sodium, a chemical compound containing about 50 per cent. of mercury combined with carbon in a non-iononisable form. This new compound is claimed to combine high disinfectant power with great stability, possessing in these respects marked advantages over corrosive sublimate, which is reduced in alkaline saponaceous compounds to the metallic state or converted in neutral or superfatted soaps into fatty acid compounds of mercury.—Pharm. Ztg., lvi (1911) No. 4, 35.

Amidoazotoluol Ointment, which has been found by Dr. Willy Katz very efficient for the treatment of wounds, is prepared according to Froehligh by dissolving amidoazotoluol in olive oil and adding sufficient American vaseline to produce an 8 per cent. ointment.—Apoth. Ztg., xxv (1910), No. 76, 730; from D. med. Wochenschr. 1910, 1665.

"*Anodyne*" is the name given a "phenoxypropanediol" of French origin, having the composition $C_6H_5OCH_2CHOH—CH_2OH$, and said to be obtained by the action of water under pressure upon phenoxypropane-oxide. It occurs in form of colorless (white) needles, which are very soluble in water and all the organic solvents, with exception of petroleum ether, and which boil at 200° C., under 22 Mm. pressure. The specialty is recommended for the treatment of all painful affections incident to contagious fevers, as well as in nervous ailments, gout, rheumatism, etc. Being non-toxic it can be given in comparatively large doses, up to 0.5 Gm. preferably in wafers, from 1 to 4 times daily according to the nature of the case.—Pharm. Ztg., lv (1910), No. 98, 990.

Anogon is the name given to a new mercurial specialty exploited as a remedy in syphilis. It is stated to be the mercurous salt of diiodoparaphenol sulphonic acid, containing with 30 per cent. of iodine approximately 50 per cent. of mercury, calculated as metal. It forms with oil an extremely finely divided suspension, for which the advantage is claimed that its sterilization at 100° C. may be prolonged without decomposition. Pharm. Ztg., lvi (1911), No. 13, 129; from D. Med. Wschr., 1911, No. 6.

Antiendotoxin Serum is a specialty prepared from the serum of a horse by the method of Macfadyen after injecting a trituration of Asiatic cholera cultures. The serum obtained, which is preserved by the addition of 0.3 per cent. of cresol, has proven to possess marked curative and protective power when administered to guinea pigs. Of nine cases of man treated with the serum, however, only four recovered.—Pharm. Zentralh., li (1910), No. 48, 1107.

Antituman is the name of a specialty recommended for the treatment of cancer, which is said to consist of the sodium salt of "chondroitin sulphonic acid," a constituent of the arterial walls and cartilaginous tissues. It is administered subcutaneously in doses of 0.1 Gm.—Pharm. Ztg., lv (1910), No. 75, 759; from Berl. Klin. Wchschr., 1910, No. 37.

Antituman.—According to supplementary information, chondroitin-sulphonic acid is the principal constituent of the chondromucoid contained in the cartilaginous substance, and, as obtained by a special process, (not described), its sodium compound has the composition $C_{18}H_{25}NSO_{17}Na_2$. This is a white or faintly yellowish powder, very readily soluble in water, its concentrated solutions resembling solutions of acacia, and leaving an amorphous, transparent mass on evaporation. It is insoluble in alcohol, ether, acetone, benzene, glacial acetic acid and petroleum ether. On heating on platinum foil it blackens without melting and burns up partially, leaving an alkaline residue.—Pharm. Ztg., lv (1910), No. 80, 810.

Aponal is the name given to "amylen hydrate carbamite," obtained by the interaction of amylen hydrate and urea chloride, which is exploited as a new hypnotic. It has an agreeable taste, and is given in doses of 1.0 to 2.0 Gm.—Med. Klin. 1911, 1234.

Aqua Zeozoni is the name given to a yellowish brown liquid which is claimed to possess the property of absorbing the ultra-violet rays and is recommended on this account in ophthalmic treatment to remove the blinding effect of light. The preparation is described as being a 0.3 to 0.5 per cent. solution of an ortho-oxy-derivative of aesculin, neutralized with boric acid.—Pharm. Ztg., lvi (1911), No. 56, 566; from Berl. Klin. Wschr. 1911, No. 27.

Arecovetrol is the name given to a veterinary specialty which is reputed to be very effective in the treatment of paunch paresis and similar affections of the stomach of ruminants. It is supplied in form of capsules, 4 red and 4 grey, to be administered alternately, one capsule at a dose. The *red* capsules each contain 0.1 Gm. of arecolin hydrochloride in a medium of powdered nux vomica seeds deprived of the parenchyme; the *grey* capsules contain 0.1 Gm. of veratrine sulphate in the same medium.—Bert. Tierärztl. Wschr. 1910, No. 30.

Argentaminalbumose (silver nitrate-aethylen diamine albuminose) is a water-soluble preparation containing about 7 per cent. of silver, employed in gonorrhœa in 0.25 per cent. solution as injection.—Münch. Med. Wchschr., 1910, No. 32.

Arsenflutan is the name under which an alcohol-free solution of ferro-mangani peptonate with arsenic is exploited. The preparation is represented to contain 0.6 per cent. of iron, 0.1 per cent. of manganese, and 0.01 per cent. of arsenic trioxide, and is said to possess permanent stability.—Pharm. Ztg., lvi (1911), No. 25, 254.

Arsenocerebrin is the name given to a liquid specialty, supplied in ampuls, which is composed of cerebral extract and sodium cacodylate, and is recommended as a remedy in epilepsy.—Pharm. Ztg., lvi (1911), No. 65, 654; from Berl. Klin. Wschr., 1911, No. 31.

Asyph is the name given to cacao-butter pencils containing mercury and supplied for the convenient introduction into the folds of the balanus for the treatment of the gland. They are supplied in two strengths: I = 0.02 Hg and II = 0.05 Hg in each stilus.—Pharm. Ztg., lv (1910), No. 67, 676.

Atophan, a 2-phenylchinolin-4-carbonic acid, is extolled by Dr. E. Heller as an excellent gout remedy. As an antirheumatic, also, he regards it fully as efficient as aspirin, with the advantage of being free from the unpleasant by-effects of the latter remedy.—Pharm. Ztg., lvi (1911), No. 25, 254; from Berl. Klin. Wschr., 1911, No. 12.

Avantol is the name given to a new disinfectant and deodorant specialty, consisting of a solution of cresolsulphonic acid, which is said to replace qualitatively the preparation heretofore exploited under the name of "Sanitol."—Pharm. Ztg., lvi (1911), No. 22, 219.

Azodermin "Afga" is the name given to an acetyl compound of amido-azotoluol, which is exploited as a non-poisonous substitute for the azo-coloring matters heretofore employed in wound treatment. The new preparation is supplied in form of a very fine yellowish-red powder, soluble in ether and in alcohol. It is employed in form of 8 or 10 per cent. ointment.—Therap. Monatsh., 1911, No. 12.

Brausan is the name given to a specialty in the form of compressed bricks, which are exploited for the preparation of carbonic acid baths, combining also the effects of boric acid or borax, other forms containing also sulphur, iodine or iron.—Pharm. Ztg., lv (1910), No. 55, 557.

Buccosperin Capsules is the name given to a new anti-gonorrhoicum, consisting essentially of the active constituents of copaiva and buchu leaves, with addition of minimum doses of hexamethylamine and salicylic acid, enclosed in gelatin (gelodura) capsules of the size of small beans.—Pharm. Ztg., lvi (1911), No. 27, 274; from Berl. Klin. Wschr., 1911 No. 13.

Catechu Tooth Powder, according to Dr. Volz, is a specialty composed of calcium and magnesium carbonates, with addition of 4 per cent. of medicinal soap containing 2.5 per cent. of thymol, of 1 per cent. of catechu, and of aromatics, with saccharin to sweeten.—Pharm. Ztg., lv (1910), No. 97, 977.

Chinarsil is the name given to a veterinary remedy recommended for mouth and foot rot, which is supplied in form of ampules. It is composed of 33 per cent. of quinine and 67 per cent. aminophenylarsenic acid divided

in suitable doses of variable strength.—Pharm. Ztg., lvi (1911), No. 101, 1020.

Citrospirinum is the name given to a new antipyretic and antirheumatic specialty in the form of tablets, combining the properties of acetylsalicylic acid with the central excitant action of caffeine citrate.—Pharm. Ztg., lvi (1911), No. 13, 129.

Credargan (Credo argentum) is a new silver preparation introduced by the manufacturer of "Ungt. credé" in all of the silver preparations exploited by him heretofore, such as bacilli, globuli, pilulæ, pastæ, pulveres, suppositoria, and the ointment, now designated "Ungt. Credargan," the latter also containing a new fat-vehicle which is absorbed more rapidly than the vehicle formerly employed. Credargan is claimed to possess the advantage of the silver preparations hitherto in use by its freedom from unstable protective substances, such as albumen, peptone, etc., and in being much cheaper.—Pharm. Ztg., lv (1910), No. 71, 714.

Crotalin, which is prepared from the venom of the rattlesnake (*Crotalus adamanteus*) by drying, pulverizing, and subsequent specific treatment, has heretofore been recommended for the treatment of pulmonary affections. Dr. Fackenheimer now recommends a trial of the remedy in epilepsy. The remedy is supplied, of various potencies, in sterilized ampules, but there is little known concerning its chemical composition. It is administered subcutaneously.—Pharm. Ztg., lvi (1911), No. 73, 738.

Cygo-Tablets constitute a specialty which is intended to replace a diuretic tea commonly prepared from a mixture of drugs recommended by Dr. Hesse, whose formula is as follows: Fol. uva ursi, 70.0; rad. ononidis, 20.0; lign. sassafras, 20.0; herb. herniariæ, 20.0; fruct. petroselini, 5.0; fol. menthæ pip., 15.0. Omitting sassafras wood, and replacing it by buchu and birch leaves, an extract is prepared from these ingredients, and formed into tablets, each representing 5.0 Gm. of the tea mixture, and sufficient for a cup of tea, which is used as an aid in the gonorrhœa therapy.—Pharm. Ztg., lvi (1911), No. 93, 940; from Med. Klin., 1911, 1735.

Digistrophan Diureticum No. 1 is the trade-name given to tablets, each representing 0.1 Gm. digitalis leaves, 0.05 Gm. strophanthus seeds, and 0.2 Gm. sodium acetate.

Digistrophan Diureticum No. 2 consists of tablets containing caffeine-sodium acetate in place of sodium acetate.—Pharm. Zentralh., li (1910), No. 26.

Digitan is the name given to a normal dialysate prepared from fresh digitalis leaves, and is claimed to contain their active constituents in pure form, standardized to a specific physiological value; 1 Gm. of this preparation representing 1 Mgm. of active constituents.—Pharm. Zentralh., lii (1911), No. 27, 716.

Digytil is the name given to a concentrated infusion of digitalis, obtained by a special method of extraction from digitalis leaves with steam under high pressure and containing as correctives additions of valerian and peppermint, presumably in form of tincture and menthol. It is recommended for administration in doses of 20 drops every 2 hours.—Bert. klin. Wschr. 1911, No. 40.

Extradigin is a specialty claimed to contain the total active constituents of digitalis leaves, which are represented in the preparation weight for weight. It is supplied in form of tablets, each representing 0.1 Gm. of the leaves.—Pharm. Ztg. lvi (1911), No. 95, 962.

Eisensajodin (Iron-sajodin) is the trade name given to a compound of iron and "sajodin", containing in round numbers 25 per cent. of iodine and 5.7 per cent of iron, chemically combined with the readily assimilable and easily tolerated "bebenic acid". It is supplied in form of tablets containing 0.5 Gm. each, and is also exploited in form of a codliver oil and an emulsion.

Eisensajodin-Leberthran (codliver oil) and *Eisensajodin-Emulsion* are prepared with aromatized codliver oil and contain 0.02 Gm. of iodine and 0.008 Gm. of iron in each 10 Cc. Both are free from alcohol.—Pharm. Ztg. lvi (1910), No. 75, 759; from D. Med. Wchschr. 1910, No. 36.

Embarin is the name given to a new antisyphilitic, consisting of a solution of 6⅔ per cent. of sodium-mercuri-salicyl-sulfonate and ½ per cent. of acorin. The mercuric compound containing about 44 per cent. of mercury, embarin contains 3 per cent. of the metal, which, however, is not in the usual form of saline combination, and its solutions, therefore, do not give the usual reactions. On this circumstance the exploiters of the new specialty base the assumption that the toxicity of the mercury is correspondingly reduced in the new antisyphilitic, and suggest its possible utility as an adjunct to the treatment of syphilis with salvarsan. Embarin is supplied in ampuls in form of a clear, light yellow solution.—Med. Klin., 1911, 1553.

Erepton is the name given by its exploiters to a new nutrient preparation obtained by completely digesting sound meat, deprived of fat and sinews, consecutively with pepsin, trypsin and erepsin, and converting the product into a dry powder by suitable means. Erepton is supplied in form of a brownish, hygroscopic powder, readily soluble in water, having an odor and taste reminding of the usual meat extracts. 100 Gm. contain about 12 Gm. of nitrogen. The preparation is free from the biuret reaction, and is indicated in all cases, in which a diminution or cessation of fermentative, digestive action is diagnosed. While it is usually employed in such cases in the form of clysters at the body temperature, it may also be administered per os by admixture with the various kinds of food.—Pharm. Ztg., lvi (1911), No. 91, 923.

Eubilein is the name given to a chologogue specialty supplied in the form of gelatin capsules which become effective in the intestinal tract. The remedy is prepared from the bile of healthy animals, collected under veterinary control.—Pharm. Ztg., lv (1910), No. 92, 929; from Mediz. Klinik, 1910, 1701.

Euphyllin is the name given to "Theophyllin-aethyleudiamine," obtained by the successful union of the sparingly soluble xanthin base and the diamines, with production of a very soluble double-compound. Euphyllin is soluble in water to the amount of 40 per cent. and may therefore be administered both by intramuscular and rectal injection instead of as heretofore per os, such a method of administering the diuretics of the xanthin-series (theobromin, theophyllin) having long been desirable in many cases.—Pharm. Ztg., lv (1910), No. 98, 991; from Therap. Monatsh., 1910, No. 11.

Eusapyl is the name given to an aqueous solution of chlor-meta-cresol and potassium ricinoleate, which is recommended as a disinfectant possessing marked antiparasitic action. It is claimed to be particularly useful for the disinfection of the hands (in surgical practice? Rep.).—Pharm. Ztg., lvi (1911), No. 42, 423; from D. Med. Wschr., 1911, No. 20.

Eustenin is a specialty composed of theobrominesodium and sodium iodide, which is recommended as a substitute for the usual iodides when such are indicated in the treatment of arteriosclerosis. It is claimed that aside of the beneficent effect of the theobromine content in reducing blood pressure its specific iodine effect is pronouncedly greater than that of ordinary iodides. The remedy is well tolerated and not accompanied by untoward by-effects even when taken for a prolonged period.—Pharm. Ztg., lvi (1911), No. 43, 437; from Nowoje W. Medicinie, 1911, No. 2.

Eutectan is the name given to a new guaiacol compound, which proves to be essentially an acid bismuth salt of guaiacol containing guaiacol in excess. It represents a dark brown powder, having a faintly aromatic odor, is exhibited both externally and per os, and has proven efficient in burns, furuncles, abscesses and ulcers, being applied as dusting powder and in form of ointment. In the form of 2 per cent. suspension it has been used with advantage in gonorrhœa. Internally it is administered in doses of 0.2 and 0.5 to 1.0 Gm. in ulcerations of the stomach and bowels, particularly in chronic catarrh of the latter, etc.—Pharm. Ztg., lv (1910), No. 59, 598.

Fermentine is the name given to a specialty consisting of the protoplasm and nucleins of yeast, supplied in the form of a microscopically fine, perfectly dry, yellowish-white powder, having a faint yeast-like odor. It adheres well when applied to the skin, and is easily combined in all proportions with starch, talc, milk sugar, etc., or incorporated with ointments, pastes, and the like. It possesses reducing properties and is mildly anti-

septic, and contains about 7 per cent. of proteins, 2 per cent. of nuclein-nitrogen, and 3 per cent. of fat. Use: per os and, externally, in skin diseases.—Pharm. Ztg., lvi (1911), No. 32, 322; from Monatsh. f. prakt. Dermat., 1911, No. 7.

Fiamuls is the trade name given to an egg-emulsion of codliver oil combined with iodide of iron and the hypophosphites of calcium and sodium.—Pharm. Zentralh., lii (1911), No. 13, 346.

Formocyl tablets, the composition of which is not given, are exploited as a remedy in Diabetes mellitus.—Pharm. Ztg., lvi (1911), No. 43, 437; from Allgem. Med. C.-Ztg., 1911, No. 12.

Frigusin has been analyzed by Dr. Aufrecht who finds it to consist of a solution of about 23 per cent. of iodized resin acids in collodion. The exact figures obtained are: collodion, 76.75 per cent.; iodine 18.14 per cent.; resin acids, 5.06 per cent.; mineral matter, 0.05 per cent. The iodine is present in a very loose combination with the resin acids, which accounts for the efficiency of this preparation when in contact with the skin, coupled with the protection film of the collodion.—Pharm. Ztg., lv (1910), No. 59, 598.

Gelina Digitalis are described as bean-shaped medicaments, each containing the active constituents of 0.05 Gm. of standardized digitalis leaves in a stable condition. The leaves are extracted by maceration in water and gelatin is added in proper proportion to the heated infusion; or, the drug may be extracted direct by maceration in liquefied gelatin. The resulting jelly is hardened by removing the water as much as possible, and rendered elastic by the addition of glycerin. The mass is then molded and the "beans" are hardened by treatment with formaldehyde—the medicament becoming effective when it reaches the intestinal tract.

Gelina Strophanti (and others) are prepared in the same or similar manner.—Pharm. Ztralh., lii (1911), No. 27, 717; from Wien. Klin. Wschr., 1911, No. 23.

Glutannin is the name given to a compound of tannin with vegetable albumin derived from wheat flour, which is exploited as a remedy in diarrhœa. It is claimed that the water-soluble wheat-albumen, which is split off from the glutannin when it reaches the intestine, does not undergo the complicated decomposition and produce the decomposition products characteristic of animal albumen and consequent irritant action of the latter. The preparation is supplied in powder and in tablets of 0.3 Gm. each, the dose being 2 to 3 tablets 3 to 5 times daily.—Pharm. Ztg., lvi (1911), No. 65, 654; from Münch. Med. Wschr., 1911, No. 32.

Grassolin Emulsion is a specialty which is said to be composed essentially of codliver oil, water and a little soap, containing besides only very small quantities of sulphates and phosphates.—Pharm. Ztg., lvi (1911), No. 6, 54.

Gravidin is the name given to a fluidextract prepared by a cold process of extraction from the fresh plants of *Fucus serratus*. It is a red-brown liquid having a peculiar taste and a faintly aromatic odor, and is recommended in doses of ten drops every two hours for the relief of nausea in pregnancy.—Pharm. Zentralh., li (1910), No. 49.

Gynin, a specialty exploited as a vaginal antiseptic has been analyzed by Dr. Aufrecht, who found the following composition: Boric acid, 31.7 per cent.; H_2SO_4, 12.15 per cent.; Cl, 7.25 per cent.; Al_2O_3, 6.47 per cent.; NaOH, 15.82 per cent.; KOH, 4.75 per cent.; organic substances, 9.70 per cent.; water, 12.16 per cent. It is supplied in form of a white crystalline powder, having a menthol-like odor; readily soluble in water; partly soluble in alcohol and in glycerin; insoluble in ether, chloroform, or benzene.—Pharm. Ztg., lv (1910), No. 70, 707.

Hegonon is the name given to a silver-nitrate-ammonium-albumose, obtained by treatment of silver-ammonium nitrate with albumose, and containing about 7 per cent. of silver. It is soluble to the amount of over 10 per cent. in water, producing a non-alkaline solution, which does not coagulate albumen solutions nor give a precipitate with common salt solution. (Compare with "Argentaminalbumose)—Münch. Med. Wchschr., No. 32.

Helgotanum Bromatum is the trade name given to a "brom-tannin-methylenamide" compound, containing about 20 per cent. of bromine, which is supplied in the form of a yellow-brown, odorless and tasteless powder, and is recommended for external use as dusting powder and in form of ointment.—Pharm. Zentralh., lii (1911), No. 13, 346.

Hepin-Oxygen Baths are prepared by the aid of a ferment derived from the liver (which its exploiters have named "hepin") from hydrogen dioxide added to the bath water in certain proportions. The contents of an original vial of "hepin" and 1 liter of 3 per cent. hydrogen dioxide are sufficient for a full bath. The elimination of oxygen begins rapidly, so that within 10–15 minutes the water is fully charged with oxygen bubbles and the bath is ready for use.—Pharm. Ztg., lvi (1911), No. 95, 962.

Hexamekol is the name given to a compound of guaiacol and hexamethylamine which is supplied in the form of a white crystalline powder, has the odor of guaiacol and is said to contain 0.65 per cent. of this medicament. It is exploited as a local anodyne which is particularly useful in pleuritic pain, and is best applied by rubbing into the skin with the hand, which should be protected by a rubber-glove.—Pharm. Ztg., lvi (1911), No. 47, 477; from Münch. Med Wschr., 1911, No. 23.

Histopin is the name given to a locally-immunizing extract of staphylococci, prepared from the latter by shaking-out and centrifugation, and combining the extract so obtained with gelatin and 0.5 per cent. of carbolic acid. It is applied in substance by penciling, or in form of a 20 to

50 per cent. salve in the treatment of scabby eruptions and similar cutaneous affections.—Pharm. Zentralh., lii (1911), No. 27, 717; from Med. Klin., 1911, No. 13.

Hydropyrin is the name given to a saline compound of acetylsalicylic acid, which is exploited as a substitute for salicylates, over which it has the advantage of markedly inferior toxicity. The new remedy is readily soluble (in water?), not unpleasant in taste, and splits off salicylic acid in the organism, which is completely eliminated in the urine.—Pharm. Ztg., lvi (1911), No. 43, 437; from D. Med. Wschr., 1911, No. 2.

Hyperol is the name given to a solid form of hydrogen dioxide which, according to the chemical investigation of Dr. J. Milbauer, is a compound of the hydrogen dioxide with urea, rendered stable by the addition of very little citric acid—its exact composition according to the analytical data being: Urea, 65.70 per cent.; H_2O_2, 34 per cent.; citric acid, 0.08 per cent. It is soluble in water (to the amount of 60 per cent.) and in alcohol; but ether extracts only free hydrogen dioxide. Hyperol is supplied in the form of a fine crystalline powder and in tablets, each containing 1 Gm.—Pharm. Ztg., lvi (1911), No. 65, 654; from Chem. Ztg., 1911, No. 95.

Insipin is the name given to a new tasteless quinine derivative, containing 72.2 per cent. of quinine, which is described as the sulphate of quinine-glycolic acid ester, and is supplied in form of a white, tasteless, crystalline powder, insoluble in cold water and in cold alcohol, and only sparingly soluble in the hot solvents. The new compound has the advantage over the similar compounds hitherto known, in being split up more readily by alkalies. Containing practically the same amount of alkaloid as quinine sulphate (= 72.8 per cent.), it is administered in the same doses in malarial affection, and is particularly adapted for the treatment of children because of its tastelessness.—Pharm. Ztg., lvi (1911), No. 96, 970.

Iodanthrak is the name given by Sabbatani to an absorption product of iodine and animal charcoal, containing 20 per cent. of iodine. It forms a light-black, dry, odorless and tasteless powder, insoluble in water, contains no free iodine, and fails to give the starch reaction; possesses great stability, and may be sterilized dry without decomposition. Iodanthrak may be used both externally and internally, is free from irritant or injurious effects, and is tolerated when other iodine preparations are not well tolerated in the stomach. Externally it is recommended for the treatment of wounds. It is supplied in the form of fine powder inclosed in sterilized tubes, and also in form of tablets of 0.1 to 0.2 Gm. each.—Pharm. Zentralh., lii (1911), No. 77, 717; from Berl. Klin. Wschr., 1911, 7140.

Iodocitin is claimed to be a chemical combination of iodine with lecithin and albumin. Analyzed by Prof. Neuberg the compound, which is supplied in the form of tablets, contains the amount of iodine (0.06 Gm. in

each), but not all of it in organic combination, about 0.024 Gm. of the iodine being present as an inorganic compound. Nevertheless, the therapeutic claims made by the manufacturer seem to be justified by the clinical results obtained by the author.—Pharm. Ztg., lvi (1911), No. 65, 654; from Therap. d. Gegenw., 1911, No. 8.

Iodostarin is the name given to a new iodine preparation which its exploiters describe as being the di-iodide of "taririnic acid," an unsaturated fatty acid belonging to the sorbin series, and, having the constitutional formula of $CH_3(CH_2)_{10}.CC.(CH_2)_4.COOH.$, is consequently isomeric with stearolic acid. Iodostarin forms fine, shining white crystalline scales (m. p. 49° C.,) containing 47.5 per cent. of iodine. It is odorless and tasteless; completely insoluble in water; sparingly soluble in cold alcohol, but readily soluble in ether, chloroform, carbon disulphide, benzol, and all other fat-solvents. In the dry state it possesses pronounced stability, and is not affected by light, but its solutions rapidly become brown on exposure, partially splitting off iodine. The new preparation is recommended for internal use, in form of tablets (0.25 Gm. each, and does not become active until it reaches the alkaline fluids of the intestines, in which it is soluble.—Pharm. Ztg., lvi (1911), No. 82, 827.

Iodvaselin is said to be obtained by heating 100 Gm. of vaselin with 4 Gm. of iodine for 4 or 5 hours on a water-bath at a temperature of 50°–60° C. The product is of a blackish color and is non-irritant even when injected into the tissues.—Monatsh. f. prakt Dermat., *51*, (1910), 28.

Isorptol is the new trade name given to an ointment-like preparation heretofore exploited under the name "Sapogen Iodi." It contains 10 per cent. of iodine, is not unpleasantly odorous, and does not color the skin very decidedly.—Pharm. Zentralh. li (1910) No. 24.

Jalon is the name given to a collargol preparation which is exploited for internal use and is represented as being an indefinitely permanent brown liquid having an agreeable taste and containing collargol-Heyden in such quantities that it may be administered in adult doses ranging from 5 to 6 Gm., repeated up to 6 times daily. The medicament may be administered by itself or mixed with water, tea, cocoa, coffee or soups, and may also be sweetened by the addition of sugar if desirable.—Pharm. Ztg. lvi (1911), No. 25, 254.

Joha is the name given to a salvarsan trituration with iodipin and anhydrous lanolin, containing 0.4 salvarsan in 1.0 Gm. The preparation is described as being perfectly stable.—Bert. Klin. Wschr. 1911, No. 36.

Kacepebalsam is the name given to "acetylsalicylic acid-mentholester," a compound obtained by the acetylation of menthol salicylate. It is described as a yellow thick-oily liquid, of faintly acid reaction, and a somewhat menthol-like odor.—Pharm. Ztg. lvi (1911), No. 7, 67.

Kalmopyrin is the name given to the calcium salt of acetylsalicylic acid, which is supplied both in the form of powder and of tablets. It contains in anhydrous condition 10 per cent. of calcium and 90 per cent. of acetylsalicylic acid, and like the corresponding lithium salt, exploited under the name of

Hydropyrin, it is very readily soluble in water.—Therap. d. Gegenw., 1911, No. 7.

Kardomin is the fanciful name given to a specialty which is exploited as the most "harmless" and "certain" remedy for restoring grey hair to its original color; exerting at the same time a cleansing and tonic effect on the scalp. Subjected to analysis, it is found to consist of a faintly perfumed liquid containing a deposit of sulphur (1.52 per cent.), and holding in aqueous solution 1.17 per cent. lead acetate, 0.13 per cent. acetic acid, and 9.60 per cent. glycerin.—Pharm. Ztg., lvi (1911), No. 7, 67.

Kefyrogen-Feolathan are tablets which by simple solution in milk are said to produce iron-kefir. They are described as being prepared by combining "kefyrogen" (pure kefir-ferment) with "feolathan" (ferro-ammonium lactate.—Pharm. Ztg., lv (1910), No. 55, 557.

Kranit Pastilles are a specialty containing phosphorus in the metalloid condition, each pastille representing 0.5 Mgm. of the phosphorus protected by a patented process so as to remain indefinitely unchanged. The pastilles are intended to replace phosphorated cod-liver oil as a medicament.—Pharm. Ztg., lvi (1911), No. 65, 654.

Kresosteril is the trade name given to tablets composed of pure m-cresol-o-oxalic acid ester, each containing theoretically 70 per cent. of pure m-cresol and 30 per cent. of oxalic acid. The ester melts at 54° C., is split by contact with water into its constituents, and is completely soluble in water to the amount of 3 per cent. To impart to the solution the character of a disinfectant, the tablets are dusted with a blue coloring matter. The solution has a faint cresol odor.—Pharm. Ztg., lv (1910), No. 89, 898; from Hyg. Rdsch. 1910, 1041.

Laxanin-Aperient chocolate is aromatized castor-oil-chocolate containing in each dose 0.1 Gm. phenolphthalein.—Pharm. Ztg., lv (1910), No. 105, 1056.

Lenicet Mouth Wash in solid form contains lenicet, peroxide and menthol. It is claimed that in use active oxygen is developed and its action modified by the cooling and cough-allaying effect of the menthol and astringent properties of lenicet-alumina.

Lenicet Tablets are composed of 0.3 lenicet and 0.2 hexamethylentetramine, and are intended to improve and correct the individual action of the components as internal antiseptics and antiferments.—Pharm. Ztg., lv (1910), No. 105, 1056.

Lenirenin is the name given to a specialty in form of a dusting powder, exploited as a remedy for affections of air passages and used by insufflation. It is said to be composed of lenicet and freshly precipitated and dried aluminium hydroxide, together with suprarenal substance (0.04–1000.0) and 2 per cent. of cocaine.—Pharm. Ztg., lvi (1911), No. 75, 758.

Libidol is the name of a specialty exploited as a remedy in nervous impotence, and is claimed to be composed of an alcoholic extract of yohimbe bark, and the extracts of muira-puama and of kola-nut. It is supplied in liquid form.—Med. Klinik, 1910, 1019.

Liqual is the name of a preparation of aluminum acetate and hydrogen peroxide in form of a solution, recommended as being superior to liq. alumin. acet. for the purposes for which the latter is ordinarily used—such as the washing of wounds, fomentations, gargles, etc.—Pharm. Ztg., lvi (1911), No. 54, 545.

Lipoiodin (Lipojodin) is the name give to a new iodine preparation, of Swiss origin, which is stated to be the ethylester of a double iodinized unsaturated acid of the higher fatty series, to which the formula $C_{19}H_{39}CI=CI—COOC_2H_5$ is assigned by its manufacturers. It occurs in the form of white crystals,either as large needles or as small scales, and in accordance with the formula given contains 41.06 per cent. of iodine, which can be determined in the usual way only after the destruction of the molecule. Lipoiodine is soluble in alcohol to the amount of 1.3 per cent. at 15° C., but at 70° C. dissolves to nearly 10 per cent. In oils, fats, benzol, chloroform and ether it is soluble in all proportions, but in water it is insoluble. While in the solid form it is stable under the influence of diffused daylight, its solutions are decomposed on such exposure, iodine being slowly evolved. It is perfectly tasteless, and therefore readily administered by the mouth, being supplied in the form of tablets which quickly disintegrate in the mouth—the dose being 0.3 to 1.5 Gm. as a substitute for potassium iodide, over which it is claimed to have the advantage in not producing iodism.—Pharm. Ztg., lvi (1911), No. 31, 315; from Therap. Monatsh. 1911, No. 4.

Masticol is the name given to a modification of v. Oettingen's mastic solution. It is said to consist of 20 Gm. mastic, dissolved in 50 Gm. benzol, to which 20 drops of an ester (not named) is added, and is used, like v. Oettingen's solution, in the treatment of wounds.—Pharm. Ztg., lvi (1911) No. 32, 322; from Münch. Med. Wschr. 1911, 688.

Melicedin is the name of a specialty, exploited as a remedy in diabetes melitus, which is composed of the citrates of strontium and sodium in combination with glycerin. According to an analysis the white powder supplied under this name contains 5.97 per cent. water, 48.92 per cent. acid strontium citrate, 21.66 per cent. acid sodium citrate, and 23.45 per cent. glycerin. The preparation has a sweet-acidulous taste, a faint acid

reaction, and is given in doses of a teaspoonful.—Pharm. Ztg, lvi (1911), No. 95, 962.

Mercinol is the name given to the "Breslau Grey Oil," which is composed of: Hydrarg., 5.0; lanolin anhydric., 2.0; ol. derizini, 6.5; and is recommended for the treatment of syphilis in connection with the salvarsan preparation, "Joha" (which see), by the same exploiters.—Bert. Klin. Wschr. 1911, No. 36.

Metaferrin is the name given to a new iron-albuminate containing 10 per cent. each of iron and phosphoric acid. It is also supplied in combination with arsenic and with iodine:

Arsenmetaferrin containing 0.1 per cent. of arsenic;

Iodmetaferrin being composed of 7.5 per cent. of iodine, in organic combination, 7.5 per cent. of iron, and 8 per cent. of phosphoric acid.

Metaferross is the name applied to a liquid form of metaferrin. It contains about 4 per cent. of iron and 4 per cent. of phosphoric acid, and has an agreeable taste.—Pharm. Ztg., lvi (1911), No. 91, 923.

Myrtyl is the name given to two huckleberry preparations, tablets and syrup, which are claimed to contain the active constituents of the fruit, including the coloring matter and tannin in natural condition but concentrated form. These specialties are recommended for the treatment of acute and chronic intestinal catarrh.—Pharm. Ztg., lv (1910), No. 67, 676.

Neura-Lecithin is the name given to designate lecithin containing 70 per cent. of pure lecithin, which is exploited in form of pills, tablets, and powder.—Pharm. Zentralh., (1910).

Orthonal, a new anesthetic specialty, is a combination of a 0.5 per cent. cocaine solution with a 0.75 per cent. alypin solution, to which 6 per cent. of 1 : 10000 adrenalin solution is added—all these in a medium of physiological salt solution, and final sterilization in the autoclave. It is supplied in brown ampuls of 1–2 Cc. capacity and is recommended as being advantageously used in minor surgery.—D. Med. Wschr., 1911, No. 46.

Otalgan is the protected trade name of a permanently clear solution of extract of opium and pyrazolon phenyldimethylicum in nearly anhydrous glycerin (sp. gr. 1.263). The specialty is recommended in acute inflammations of the central ear.—Therap. Monatsh. 1911, No. 9.

Otosclerol is the name given to a new medicament recommended as a remedy for auditory annoyances in ear affections. The remedy is said to contain 6.66 per cent. of cimicifugin, 36.3 per cent. of bromine, and 13.52 per cent. of phosphoric acid.—Pharm. Ztg. lvi (1911), No. 84, 847.

Ozofluin is the name given to an extract for making "fir-needle baths", which is prepared from coniferous needles under certain described conditions and containing certain innocuous coloring matters, added for the

purpose of suggestive action, and imparting to the bath a magnificently fluorescent green-yellow color. It is supplied in form of a stable granular powder in packages of 10 Cc. capacity, this sufficing for a full bath.—Therap. Monatsh. 1911, No. 9.

Pepsinogen (Herzen) is a Swiss specialty composed of meat extract and carbohydrates, exploited for the treatment of stomach and intestinal ailments.—Pharm. Zentralh., lii (1911), No. 27, 717.

Pervacuata-Preparations are concentrated infusions and decoctions (1 : 1) prepared *in vacuo*, and exploited for the extemporaneous preparation of the ordinary infusions and decoctions. These preparations, it is claimed, are characterized by extreme stability, and the infusions and decoctions are said to possess uniform activity. The process of preparation is described in Pharm. Ztg., lv (1910), No. 97, 978; from Therap. Monatsh., 1910, No. 11.

Pituitrin is the name given to a bio-chemical product obtained as an aqueous extract from the infundibular portion of the pituitary gland of neat cattle. It is claimed to possess the property of markedly increasing the blood pressure without unduly taxing the heart's action; quite to the contrary, it exerts a tonic effect upon the heart, and at the same time incites peristaltic action and promotes the flow of urine. The preparation is supplied in ampuls, each representing about 0.2 Gm. of the fresh gland, which constitutes the average adult dose.—Pharm. Ztg., lvi (1911), No. 45, 456; from Münch. Med. Wschr., 1911, No. 21.

Pituglandol is a competitive specialty, exploited to replace pituitrin (which see). It is claimed to be an extract of stability, prepared from the pituitary gland, 1 Cc. corresponding to 1 Gm. of the infundibular portion of the gland.—Pharm. Zentralh., lii (1911), No. 47.

Pnigodin is the name given by its exploiters to a new whooping-cough remedy, for which specific efficiency is claimed. It is said to consist of the non-alcoholic extractions of agreeably aromatic vegetable substances, containing certain as yet unidentified glucosidal bodies, in a medium of sugar and malt extract.—Pharm. Ztg., lv (1910), No. 61, 618.

Primal is the name of a hair dye which is said to consist of a solution of paratoluyldiamine and sulfit—the addition of the latter as a reducing agent preventing the irritant action of the amine base.—Pharm. Ztg., lvi (1911), No. 41, 416; from D. Med. Wschr., 1911, No. 20.

Propäsin Colloid (Propaesinum colloidale) is the name given to a specialty composed of 20 per cent. of propäsin (p-amidobenzoic acid-propylester), 72.5 per cent. of glycerin, 2.5 per cent. of starch, and 5 per cent. of alcohol. The mass formed from these ingredients is readily suspended in water by trituration, forming a milky mixture which serves well for its application, both internally and externally. The mass may also be applied direct to the skin, mucous membranes, wounds, etc., but

its pharmacological uses are not mentioned in the abstract from which this is quoted.—Pharm. Zentralh., (1910).

Prothaemin is the name given to a new dry blood preparation, in which the total albuminoids of the blood, together with the iron and phosphorus in organic combination, are represented. It is supplied in form of a dusty-fine, odorless and tasteless powder, which, when protected from moisture, possesses unlimited stability. Prothaemin is recommended in all conditions of ill-nutrition in doses of 1 or 2 heaping teaspoonfuls, 3 to 5 times daily. It is also supplied in the form of chocolate tablets, weighing 50.0 Gm., of which one or one and a half may be consumed daily.—Pharm. Ztg., lvi (1911), No. 99, 1003.

Pyonin is the name given to a sulphur preparation which is claimed to contain the sulphur in extremely fine division and, moreover, in a soluble form. According to the specification of a German patent, flowers of sulphur and sugar are melted together and the resulting mass after cooling is broken up, dissolved in water and finally boiled with calcined soda. The sulphur lye so obtained is then incorporated with the necessary ingredients to produce a soap and an ointment.

Pyonin ointment is a semi-solid preparation of a black brown color, containing 20 per cent. of dissolved elementary sulphur.

Pyonin soap has a brown color and the character of a so-called neutral super-fatted soda soap. It contains 5 per cent. of pyonin, together with some added glycerin and a small quantity of resorcin.—Wien. Klin. Rundsch. 1910, No. 48.

Radant, a specialty exploited for foot-baths, has been subjected to chemical investigation by C. J. Reichardt with result that point to alkali-borates, tannin compound, some plant powder and wax-like bodies as constituents, which are strongly perfumed. It is supplied in form of a yellow-brown, somewhat hygroscopic powder, but does not stain when applied to the skin, and is only partly soluble in water either cold or hot, more soluble in glycerin, and practically insoluble in alcohol. On incineration it yields 41.5 per cent. of ash.—Pharm. Ztg., lv (1910), No. 86, 869.

Riba is the name given to an albumose preparation obtained from the flesh of fish, which is distinguished by its ready solubility in water from the other nutrient albumose preparations, in particular from "plasmon," from various vegetable preparations, and from "tropon," which is also produced from the flesh of fish. It is composed almost completely of albumose, containing only insignificant quantities of saline and extractive bodies—such as puribases, creatinin, etc. Riba is supplied in form of a dry, non-hygroscopic, light-grey powder, forming a brown solution with three parts of water having a glue-like odor and faintly bitter taste, which however do not manifest themselves in its dilutions or in admixture with

solid condiments.—Pharm. Ztg., lv (1910), No. 85, 858; from Bal. Klin. Wschr. 1910, No. 42.

Ricilan is the name given to a specialty which is claimed to consist of absolutely purified castor oil rendered palatable by suitable additions. It is supplied in form of a perfectly clean oil and has an agreeable liquéur-like taste.—Pharm. Ztg., lvi (1911), No. 56, 566, from Thera. d. Gegenw., 1911, No. 7.

Ristin is the protected tradename for the monobenzoicacidester of aethylenglycol, which is recommended as an efficient remedy in the treatment of scabies, and has the advantage of being both colorless and inodorous.—Münch. Med. Wschr., 1911, No. 42.

"*Ehrlich-Hata 606*," also designated in brevity as "Ehrlich 606," is the name of a specialty recommended by Professor Ehrlich and his co-laborator Hata as a reliable specific for syphilis, and is claimed to have its origin in a comprehensive study to find an arsenic compound free from the unpleasant side-effects of atoxyl, an arsenic preparation which has heretofore acquired an enviable reputation in the treatment of syphilitic affections, and, particularly, in the so-called sleep-sickness. It is chemically the *hydrochloride of dioxydiamidoarsenobenzol*, and therefore has a constitution closely related to atoxyl (= sodium arsenilate: $C_6H_4(NH_2)$. (AsO.OH.ONa) + $3H_2O$—Rep.), and like the latter is employed subcutaneously.—Pharm. Ztg., lv (1910), No. 57, 575–576.

"*606*," a title which was given by its exploiters to a chemical compound because it was the six-hundred-and-sixth preparation experimented with by Ehrlich and his associates in their attempt to discover a specific for certain parasitic organisms, which would be relatively non-toxic to the human system, is the subject of a comprehensive paper by H. A. B. Dunning, in which he discusses the chemistry, pharmacy and pharmacological uses of this, the latest achievement of Germany's scientific industry. Mr. Dunning traces the chemical history and relations of the drug, to which the chemical title,

Dioxydiaminoarsenobenzol, is commonly given, and explains the precautions that must be observed in the preparation of the solutions which are to be used for intravenous or subcutaneous injections. He mentions in conclusion that "606" will be marketed as "Salvarsan."—Bull. Pharm., Jan., 1911, 14–18.

Salvarsan is the name under which "606" is exploited. In a recent report to the Am. Med. Association, W. A. Puckner and W. S. Hilbert describe this specialty as follows: "Salvarsan is an arsenic compound containing that metal in a low state of oxidation and the product is, therefore, a powerful reducing agent and is decomposed by bodies which are oxidizers, including air. Being a weak base its hydrochloride, when dissolved in water, is largely decomposed by the latter (hydrolyzed) and

hence gives a solution having an acid reaction. A solution of salvarsan is therefore acid and will remain so until for every molecule of salvarsan there have been added two molecules of sodium hydroxide or a similar monovalent base.—Journ. Am. Med. Assoc., *55* (1911), 2314.

W. A. Pusey, discussing salvarsan, asserts that indications are very strong that we are on the verge of a period of indiscriminate and reckless use of this remedy that will result in disappointment and damage to many patients. He further points out that this drug does not absolutely cure syphilis and that in the hands of careless or incompetent practitioners it is likely to do much harm.—Ibid., *56* (1911), 118–120.

Salvarsan is the protected commercial name of Ehrlichs' new syphilis specific, which is prepared exclusively under the control of its originator. It is a light yellow powder, containing about 34 per cent. of arsenic and is soluble in water, producing solutions with a strong acid reaction; hence the solutions are unsuited for injections unless they are neutralized according to specific directions The average dose is computed according to Michaelis on the basis of 0.01 Gm. for 1 kilogram body-weight. Salvarsan may be administered by subcutaneous, intramuscular, or intravenous injection, and its use is not interfered with by previous mercurial medication, which may even be continued or resumed if desired. Indeed, various observations seem to point to a mutual support of their respective activities.—Pharm. Ztg., lv (1910), No. 97, 977.

The exploiters of "salvarsan" give directions for preparing the neutral suspension of this product, which are apparently very simple and require but little time for carrying out; but Mr. George M. Beringer, Jr., says therein lies a trap, and some modification is required. Accordingly he describes a method which he has found to yield a satisfactory product, requiring however a very formidable array of apparatus and material, simple enough in themselves, but necessary to carry out the process satisfactorily under the conditions described in detail by the author.—Proc. N. J. Pharm. Assoc., 1911, 91–93.

The directions accompanying each package of salvarsan are discussed in a similar vein and with like recommendations by Harvey A. Henry.—Proc. Pa. Pharm. Assoc. 1911, 242–244.

Salvarsan is the name given to "diaminodioxyarsenobenzene", originally exploited under the trade designation "606". It is furnished in sealed tubes containing an indifferent gas (e. g. nitrogen), as it is an unstable compound when exposed to the air. Hence the necessity of precautionary directions for preparing its solution, which according to the method of administration are made in two ways—for intravenous use and for subcutaneous injection. Wm. K. Ilhart supplements the directions accompanying each sealed tube (or ampoule) by a description of the utensils required and the precautions to be taken by the pharmacist when preparing both or

either of these solutions, which may be consulted in Proc. Mo. Pharm. Assoc., 1911, 90–93.

Leonard A. Seltzer also contributes his experience and a description of the techique in the preparation of salvarsan solution in Bull. Pharm., Dec. 1911, 497–498.

Secalis Cornuti Dialysatum (Golaz) is a specialty representing the active constituents of ergot in form of a sterile solution, which is administered by injection, and is claimed in this form to secure the most rapid action of the medicament.—Pharm. Zertralh. lvi (1911), No. 27, 718.

Septargan is the name now given to the colloidal silver preparation recently introduced under the name "Credargan". This change in title is made to avoid possible complications arising from interference with a word-mark.

Sotopan (not "Satopan" as recently announced) is the name given to a new aromatic liquid preparation of iron, for which now the following composition is communicated: Calcium, 0.1296; bromine, 2.5; quinine, 0.3268; phosphoric acid, 0.221; sodium, 0.7 per cent.—Pharm. Ztg. lvi (1911), No. 84, 847.

Tuberculinctiv is the name given to sterilized solutions of Tuberculin Koch, in form ready for immediate use. It is supplied in three series—A, B, and C—in potencies of $\frac{1}{1000}$ Mgm. to 1000 Mgm.—Pharm. Ztg., lv (1910), No. 56, 571.

Tuberkulin Rosenbach is the special trade name of a tuberculin preparation, for which the claim is made that the toxic and intolerant bodies usually accompanying tuberculin preparations are in this reduced to a minimum. The preparation supplied is a clear, brownish liquid, having a peculiar odor, and must be protected from strong sunlight.—Pharm. Ztg., lv (1910), No. 68, 687.

Ulcerine is the name given to an ointment exploited as being efficient in the treatment of inflammations of the skin produced by radium emanations, and in other indolent ulcerations. It is said to be composed of extracts of *Popul. nigr.*, *Popul. balsamif.*, and *Popul. tremulans*, of each 3.0, aqueous extracts of *Atropa belladon.*, *Hyoscyam. nig.*, *Solan. nig.*, and *Papaver* (fruct), of each, 5.0, bals. peruv., 5.0, and lard, 40.0.—Pharm. Ztg., lv (1910), No. 97, 978; from Monatsh. f. prakt. Dermatolog., 1910, 419.

Ureabromid is the name given to a specialty, recommended for the treatment of epilepsy, which is described as a definite compound of calcium bromide and urea having the formula $CaBr_2CO(NH_2)_2$. It is supplied in the form of shining, colorless and odorless crystals, or of white powder (m. p. 186° C.,), is somewhat hygroscopic and readily soluble in water and alcohol; the taste is cooling and slightly bitter. Containing 36 per cent.

of bromine, it exceeds in its content that of most other bromine compounds. Berl. Klin. Wschr., 1911, No. 41.

Uzara is the name of a specialty recommended as an efficient remedy in dysentery, which is said to be prepared by a special process from the root of an *Asclepiadaceæ*, described as the "uzara plant." According to the investigation of Prof. A Gürber, the air-dry root of this plant contains about 15 per cent. of water, 20 per cent. of carbohydrates (starch, dextrin and sugar), 25 per cent. of substances extractable by alcohol, and 14 per cent. ash. The alcoholic extract contains neither alkaloids or tannin, but yielded three crystallizable bodies which presumably belong to the class of glucoside and bitter principles. "Uzara" is exploited in both liquid and solid form, the latter as tablets.—Pharm. Ztg., (1911), No. 56, 566.

Valaska is the name given to a specialty composed of soluble milk-casein with glycerophosphates.—Pharm. Zentralh., lii, (1911), 718.

Vasotonin (see Proceedings, 1910) has been subjected to chemical investigation by Prof. Spiegal (an authority on "yohimbine"), who states that the claim made by its exploiters that it is a definite chemical compound of yohimbine and urethane is not substantiated by his analytical results. He finds it to be a simple mixture of yohimbine nitrate with 20 times its molecular quantity of urethane, and, furthermore that 1 Cc. of the solution supplied does not contain 10 Mgm. of yohimbine but, at the most, only 8.5 Mgm. With regard to its pharmacological activity, he concludes that "vasotonin" has no advantage over a corresponding mixture of yohimbine and any other harmless sedative like urethane.—Therap. Monatsh. 1910, No. 7.

Zykloform is the protected name given to "p-amidobenzoicacidisobutylester," a specialty recommended as a local anesthetic and applied principally in the form of ointment. The 5 per cent. ointment is made by the direct solution of the zykloform in vaselin; for the 10 per cent. ointment it must first be dissolved by heat in twice its weight of olive oil —then mixed with the necessary quantity of vaselin.—Münch. Med. Wschr., 1910, No. 50.

MATERIA MEDICA.

A. General Subjects.

Plants—Functions of the Latex.—The most recent contribution to the much discussed controversy regarding the uses of the latex to plant development, is that of Bernard, who supports the view that the latex functions largely as a depository of reserve food materials. He finds that the fruits of various latex-containing and rubber-yielding plants have abundant thick latex when young, whereas the ripe fruits contain very scanty and

thin latex. This is taken as proof that the substances present in latex are used up in the formation of the fruits and seeds after being converted into other food materials. He also shows that when spurges are cultivated in air deprived of carbon dioxide, so that they cannot manufacture carbohydrate foods from external sources, the starch grains in the latex are corroded and are apparently changed into sugar for the nutrition of the plant.—Pharm. Journ. and Pharmacist, Oct. 14, 1911, 499; from Annal. du Jard. Bot. de Buitenzorg, through "Knowledge," Sept., 1911, 347.

Plants—Origin of the Carbon Assimilated.—It is well known that chlorophyllaceous plants decompose the carbon dioxide of the air under the influence of light, rejecting the oxygen, and fixing the carbon which contributes to this development. According to L. Cailletet, the carbon may have another origin, and he has established that the ferns are able to fix the carbon or organic materials contained in the soil.—Pharm. Journ. and Pharmacist, Sept. 2, 1911, 325; from Compt. rend., 1911, No. 19, 1215.

Plants—Conservation of Color and Appearance.—Wimmer describes a method for the conservation of plants (herbarium specimens) which consists in impregnating them with a saturated solution of naphthalin, to which, in order to remove its alkaline reaction on violet and red coloring matters, 1 or 2 drops of a concentrated solution of salicylic acid in absolute alcohol are added for each 100 Gm. Simple immersion in this solution usually suffices. Tender plants should be treated by means of a drop-glass, while coarser, fleshy, plants must be immersed in the solution for some time. Hollow plant-parts, such for example as bell-shaped flowers are best coated on the interior and then on the outer surface. By the described method the natural colors of plants are perfectly preserved.—Schweiz. Wschr. f. Chem. u. Pharm., xlix (1911), No. 15, 210; from Oesterr. Botan. Zschr., lx, 202-204.

Medicinal Plants—Sterilization and Drying.—Em. Bourquelot, discussing the question of preserving and drying medicinal plants, observes that the soluble ferments contained in them continue to exert their oxidizing and hydrolytic action during the process of drying, thus causing the loss of a large proportion of their active constitutents. It follows that a preliminary sterilization is necessary to prevent this untoward change, and this can be accomplished only by immersing the plant, immediately after collection in boiling alcohol, most conveniently in an apparatus specially devised by the author and his collaborator Hérissey. The question of what is the best method for the subsequent drying is, however, as yet an open one. Possibly, the method of drying the plants in a vacuum at 0° C., as proposed by Choay, may prove such: but, fortunately, it is found in practice that if the methods of drying commonly in use are carefully conducted, the loss of active constituents by fermentative action

is reduced to a minimum, and preliminary sterilization can be omitted if the plants are rapidly and carefully dried immediately after their collection. The author finds a criterion by which the proper execution of the drying process may be estimated in the fact that the content of saccharose is increased proportionally to the drying period in the roots, and decreased in the leaves.—Pharm. Ztg. lvi (1911), No. 38, 380; from Journ. de Pharm. et Chim. 1911, No. 4.

Plant Substances—Sterilization.—At the Tenth International Pharmaceutical Congress, in Brussels, Professor Perot described a method of preserving the extractive components of vegetable substances in their original condition by sterilization. In conjunction with Dr. Goris he found that by destroying the diastases it was possible to obtain dried plants which retained all the properties of fresh plants unimpaired. The method consists in heating the plants in the autoclave in a current of alcohol, whereby they retain their original fresh appearance. The pulverized plants, obtained by this process are in general more active than those dried in the customary way, and sometimes have a different action. On extraction with ether and spontaneous evaporation of the solution, products are obtained which the authors designate as "physiological extracts." These are soluble in water and contain the active constituents in the same form in which they originally existed in the fresh plant.—Pharm. Ztg., lv (1910), No. 84, 849.

Drugs, Chemicals and Preparations—Care in their Preservation.—Linwood A. Brown, Drug Chemist of the Food and Drug Division of the Kentucky Agricultural Experiment Station, has written an admirable and exhaustive paper on the care and preservation of crude drugs, chemicals, and pharmaceutical preparations, specifically mentioning most of the medicaments usually demanded and carried in pharmacies. This paper, which constitutes Bulletin 150 of the Ky. Agricultural Experiment Station, is published unabridged in Merck. Rep. for Jan., Feb., March and April, 1911, pp. 1, 42, 71 and 103.

Standards are discussed from the practical aspect by Dr. Lyman F. Kebler, who clearly sets forth the conditions obtaining and difficulties encountered relative to standards in vogue for certain commodities, in "Proceedings," 1910, 592–595.

Biological Standardization of Drugs—Method Available to Retail Pharmacists.—With the intention of presenting brief outlines of a number of methods of biological standardization which retail pharmacists would find available, Robert A. Hatcher and J. G. Brody have been devoting most of the time at their disposal to the study of one group of drugs, limiting the scope of the present paper to a single method, and a consideration of some of the drugs for which the method is available—namely the standardization of the digitalis group and some other drugs. The

method chosen consists in determining the minimum fatal dose per kg. of cat when the drug is injected slowly into the femoral vein, the standard chosen for the digitalis group being the cat unit. The cat unit may be defined most accurately perhaps, as the amount of crystalline "ouabain" (the older term for crystalline strophanthin, which the authors prefer to use to avoid confusion) which is fatal within about ninety minutes to a kilogram of cat when injected, slowly and almost continuously, into the femoral vein. A cat unit is equal to almost precisely 0.1 Mgm. of crystalline ouabain, or one ten-millionth of the weight of the animal. From their experiments, which are given in detail, with the description of carrying out the process, the authors arrive at the conclusion that the cat affords a simple method of standardizing the drugs of the digitalis group, and that this method is available for the retail pharamacist who will devote as much care to the process as is required in the chemical assay of opium.—Amer. Journ. Pharm., Aug. 1910, 360–372.

Biological Standardization of Drugs—Review of Proposed Methods, with Suggestions.—Introducing the subject of his paper on the biological standardization of drugs, Dr. Worth Hale, Assistant Pharmacologist, Hygienic Laboratory, Washington, D. C., says that "Pharmacy calls for accuracy as applied to remedial agents. Absolute and unfailing accuracy to the limits of scientific knowledge, and unvarying honesty are fundamental principles to be emphasized and dwelt upon from the beginning of a course of Pharmacy or of Medicine, until the last prescription is compounded. There should be no guesswork and every effort on the part of the pharmacist or doctor or laboratory worker to promote greater exactitude so far as drugs and medicines are concerned is to advance the healing art." It is surprising in view of the great importance of some drugs mentioned by the author that, although biological tests were proposed nearly 50 years ago, no practical application was made until 1898, when Houghton, who worked in Prof. Cushing's laboratory, communicated the first paper relating definitely to the subject of standardization (for the digitalis group). Since then the subject of biological standardization has attracted a good deal of attention from pharmacologists and more recently also from progressive manufacturers and pharmacists. In this country four methods have been proposed, namely: (1) Houghton's twelve-hour frog method; (2) Reed and Vanderkleed's method using the guinea pig; (3) Hatchers' method using the cat; and (4) the method of Famulener and Lyons, depending on the determination of the least amount of the drug to stop the action of the heart of a frog in one hour—the other three methods depending on the determination of the least fatal dose for the animal in question.

Reviewing these several methods, the author regards the method proposed by Hatcher (which is described in the preceding abstract) to be the most complex of all, although it is proposed as being available for the

use of retail pharmacists on account of its simplicity. Nevertheless. Dr. Hale considers it as unquestionably the most difficult of all the American methods. After a critical review of the several methods, the author emphasizes: "that any biological assay method for any drug should take into account that action of the drug upon which its chief therapeutic usefulness rests and that in so far as practical difficulties did not interfere this action should be made the basis of the biological method used in the assay." The type method of determining the comparative value of drugs of the digitalis group, by noting the effect upon the heart, especially of the frog, is perhaps the oldest and at the present time the most widely used, exclusively so in Europe. Three sub-methods may be described; in one the drug is given to the intact animal which is subsequently operated on to note the condition of the heart, in another the drug is given to the animal subsequent to operative procedure in which the heart is exposed, and in a third method the heart is removed from the body and perfused. The first sub-method, with a time limit from thirty minutes to two hours, is the one that has been provisionally adopted in the hygienic laboratory for testing digitalis and allied preparations, the general method of procedure being essentially the same as that suggested by Famulener and Lyon (in Proceedings 1902, 415) in which permanent systole of the frogs ventricle at the end of exactly one hour is taken as the end reaction. This is recommended by the author as being the most convenient and reliable.—Amer. Journ. Pharm., March, 1911, 97–107.

Physiological Standardization vs. *Standardization by Chemical Assay* is the subject of a joint paper by Thomas S. Githens and Chas. E. Vanderkleed, which appears in "Proceedings," 1910, 913–929.

Drug Assaying, its present Status, is the title of a comprehensive paper by Lyman F. Kebler, embodying a number of elaborate tables exhibiting the results of co-operative work, and of work by different pharmacopœial methods on opium, as also on a number of other alkaloidal drugs (aconite, belladonna, cinchona, coca, colchicum), which appears in "Proceedings," 1910, 856–872.

Drug Assays—results obtained in a few examples by Henry J. Goeckel are described in a paper which appears in "Proceeding," 1910, 1047–1049.

Drugs—Identification by Pyro-analysis.—L. Rosenthaler finds that useful assistance in the identification of a drug can often be obtained by subjecting it to heat in the dry state and examining the sublimate produced; this is especially the case when the drug is in too fine a powder for recognition by microscopic character, and the quantity available is too small for ordinary chemical examination. A small quantity of the powder is introduced by means of a long funnel into a suitable tube, so that none of it comes into contact with the side walls; the drug should be covered with a layer of asbestos, to prevent any of the powder being carried up

mechanically. The tube is closed with a rubber stopper having two holes, one of which carries a doubly bent tube leading to a small vessel acting as receiver, and a tube through the other leads to an air pump. The air is exhausted, and the tube containing the drug heated in a bath of sulphuric acid or paraffin; a sublimate will generally form in the same tube, and other distillation products will pass into the receiver, and can be tested by treatment with various solvents, etc. The following drugs gave crystalline sublimates when treated in this way:—

Cinchona gave a nearly colorless tar containing crystals, which appeared as triangles, rhombs, and hexagons, and showed bright color with polarised light; they were insoluble in ether, soluble in alcohol or acetic acid, the latter solution giving a precipitate with picric acid, Wagner's reagent, or Mayer's reagent.

Bearberry Leaves gave colorless irregular crystals, showing bright colors with polarised light, and giving reactions of hydroquinone.

Frangula Bark gave yellow columnar crystals, united with each other at angles of 45° and 90°. An ethereal solution of the sublimate gave with caustic soda the red color of oxymethylanthraquinone.

Cascara Sagrada gave bright yellow amorphous masses containing needle-shaped dark yellow or brown crystals, and darker colored drops; the oxymethylanthraquinone test gave positive result in this case also.

Rhubarb gave bright yellow masses containing crystals, some lance shaped and single, others needle-shaped in radiating groups; the residue of an ethereal solution gave a purple color with caustic soda.

Galls gave a crystalline layer resembling "ice flowers," and giving reactions of gallic acid with a little pyrogallol.

Hydrastis yielded a tar, at first colorless and afterwards brownish-yellow, which became completely crystalline with a dendritic appearance, or in parts with an appearance like that of threads of bacteria; neither hydrastine nor berberine was found in the sublimate, alcoholic solution of which gave a green color with $FeCl_3$.

Characteristic sublimates were also obtained from *opium*, *cubebs calabar beans*, *black pepper*, *aniseed*, etc.—Pharm. Journal and Pharmacist, Aug. 19, 1911, 276; from Ber. d. Deutsch. Pharm. Ges., 1911, *6*, 338.—

Powered Vegetable Drugs—Ash Determinations of Commercial Samples. —Azor and A. N. Thurston report the results of ash determinations and alkalinity of the same, of a number of drugs for which no assay methods are given in the U. S. P., believing that such tests will prove valuable if carried out in connection with the microscopic examination. In the present examination, the results were obtained with commercial samples and not with samples of known purity and unquestionable identity. The results are shown in the following table:

NAME.	Water.	Ash.	Alkalinity of Water, Sol. Ash.	Alkalinity of Water, Insol. Ash.	Total Alkalinity of Ash.
Asclepias	7.23	9.16	.90	9.06	9.96
Buchu	8.52	4.98	1.20	5.46	6.66
Caryophyllus	12.56	8.74	1.75	3.74	5.49
Cimicifuga	10.04	11.04	1.81	2.83	4.64
"	7.97	15.35	1.22	1.97	3.19
"	9.69	9.01	3.09	3.54	6.63
Cinnamomum saigonicum	8.91	3.66	1.1	2.26	3.36
Digitalis	13.48	10.66	4.80	3.30	8.10
"	8.94	12.55	3.12	4.17	7.29
"	9.88	7.52	4.7	3.2	7.9
"	2.23	9.99	3.82	3.52	7.34
Gentiana	10.89	3.47	.53	2.54	3.04
Glycyrrhiza	7.98	8.10	.96	6.06	7.02
Gossypii cortex	8.93	7.19	1.47	4.72	6.19
Hamamelidis cortex	9.39	5.68	.47	7.32	7.79
Podophyllum	10.07	6.98	.73	3.15	3.88
Prunus Virginiana	9.46	4.93	.40	8.14	8.54
Rheum	8.53	10.67	2.58	12.54	15.12
"	9.98	11.18	2.79	5.02	7.81
"	6.94	13.00	2.57	4.80	7 37
"	9.40	9.61	3.34	5.35	8.69
"	9.07	9.54	2.20	4.34	6.56
Rubus	9.36	3.49	.87	2.80	3.67
Sanguinaria	10.57	5.85	1.61	3.74	5.35
Senega	6.59	7.09	.46	3.00	3.46
Spigelia	9.09	18.72	.61	5.1	5.71
"	10.46	24.12	.21	3.1	3.41
"	6.42	40.81	1.2	23.31	24.51
Valeriana	8.43	29.23	.11	2.04	2.15
"	7.93	30.97	.22	2.07	2.12
"	7.00	20.38	.05	2.04	2.09
"	9.10	8.52	1.38	.46	1.84
Zingiber	10.94	5.62	1.79	2.68	4.47

The *moisture* given in this table embraces all that portion volatilized at 100° C. The *alkalinity of ash* is expressed as the number of cubic centimeters of decinormal acid required to neutralize that obtained from one gramme of substance—methyl orange being used as indicator.—Proc. Ohio State Pharm. Assoc., 1911, 69–70.

Ash Standards in Drugs, is the title of a paper by Charles H. LaWall and Henry A. Bradshaw, in which they give the percentages of ash determined in a large list of drugs, and express an affirmative opinion on the question "Are they necessary," in Proceedings," 1910, 751–756.

Adulteration of Vegetable Drugs.—A summary is a contribution by Albert Schneider, which appears in "Proceedings," 1910, 1064–1065.

Crude Drugs—quality of some examined in 1909 is described by Hermann Engelhard in "Proceeding," 1910, 1256–1258.

Chinese Drugs—Some objectionable and unusual kinds imported into the United States, comprising a list of 84 different kinds, are enumerated and described by Albert Schneider in a paper which appears in "Proceedings," 1910, 1066–1077.

Medicinal Plants of North America—Botanical and Morphological Description.—Theo. Holm continues his botanical and morphological description of North American medicinal plants, annually contributed since 1907. The following papers, accompanied by excellent illustrations, have appeared in Mercks' Report from July 1910 to December 1911, inclusive :—

Glechoma hederacea, L. (N. O. Labiatae), a perennial herb, popularly known as "Ground Ivy," "Robinrunaway," "Gill-over-the-Ground," "Alehoof," and "Herpa Hederae terrestris," is described in the July number, 1910, 194–196.

Rubus villosus, Ait. (N. O. Rosaceæ), one of the three species mentioned in the U. S. P. as yielding the official drug "Rubus," and known throughout the eastern United States as the "High or Common Blackberry," is described in the August number, 1910, 217–220.

Solanum Carolinense, L. (N. O. Solanaceæ), commonly known as "Horse Nettle," "Sand Briar," "Poisonous Potato," and "Apple of Sodom," is described in the September number, 1910, 249–251.

Apocynum Cannabinum, L. (N. O. Apocynaceæ), popularly known as "Wandering Milkweed," is described in the October number, 1910, 277–280.

Grindelia squarrosa (*Pursh*), Dunal., (N. O. Compositæ), called "Gum-plant" in California because, in common with several other species of Grindelia, it is characterized by its balsamic viscid herbage, is described in the November number, 1919, 310–312.

Rhus glabra, L. (N. O. Anacardiaceæ), known by the popular names "Smooth Sumach," and "Pennsylvania Sumach," and "Upland Sumach," is described in the December number, 1910, 338–340.

Coptis trifolia, Salisb. (N. O. Ranunculaceæ), commonly known as "Goldthread," is described in the January number, 1910, 4–6.

Stillingia sylvatica, L. (N. O. Euphorbiaceæ), known by numerous popular names, such as "Queen's delight," "Queen's root," "Yaw root," "Marcory,,' "Cockup hat," "Silver leaf," etc., is described in the February number, 1911, 36–38.

Arisæma triphyllum, (L.), Torr. (N. O. Araceæ), known among other common names as "Indian Turnip," "Jack-in-the-Pulpit," "Dragon root," "Wake-robin," and "Pepper Turnip," is described in the March number, 1911, 66–69.

Arctostaphylos Uva-ursi, Spreng. (N. O. Ericaceæ), variously called

"Bear-grape," "Bear-berry," "Heth," "Mountain-box," "Red berry," "Upland Cranberry," is described in the April number, 1911, 95–96.

Ilex opaca, Ait. (N. O. Ilicineæ), popularly known as "holly," is described in the May number, 1911, 124–126.

Monarda punctata, L. (N. O. Labiatæ), commonly called "Horse-mint," is described in the June number, 1911, 154–156.

Asarum Canadense, L. (N. O. Aristolochiaceæ), known as "Wild Ginger," "Indian Ginger," "Canada Snake-root," "Heart Snake-root," "Broad-leaf Asarabacca," and "Colts foot," is decribed in the July number, 1911, 185–187.

Cephalanthus occidentalis, L. (N. O. Rubiaceæ), known among other common names as: "Button-Bush," "Butter-Bush," "Pond Dogwood," "White Ball," "Little Snowball," "Swamp root," "Globe flower," and (in Louisiana) as "Bois de marais," is described in the August number, 1911, 216–218.

Scutellaria lateriflora, L. (N. O. Labiatæ), variously known by the common names of: "Mad-dog Scull-cap," "Officinal Scull-cap," "Mad-weed," "Hoodwort," "Blue Pimpernel," and "Hooded Willow-herb," is described in the September number, 1911, 247–149.

Acorus Calamus, L. (N. O. Araceæ), popularly known as. "Sweet flag," "Flag-root," "Sweet cane," "Myrtle flag," "Sweet grass," "Sweet root," and "Sweet rush," is described in the October number, 1911, 277–281.

Ampelopsis quinquefolia, L. C. Rich. (N. O. Ampelideæ), known as the "Virginia Creeper," is described in the November number, 1911, 309–311.

Magnolia glauca L. (N. O. Magnoliaceæ), popularly known as: "Sweet Bay," "White Bay," White Laurel," and occasionally "Swamp Sassafras," "Beaver Tree," etc., is described in the December number, 1910, 336–339.

B.—VEGETABLE DRUGS

(Arranged in the order of their Botanical Source)

ALGÆ

Laminaria—Cause of Swelling when Immersed in Water.—It is very generally assumed that the swelling of laminaria stems when exposed to moisture is due to the mucilage contained in them. The experiments of O. Tunmann, however, show that this is only partly true, for he finds that stems that have been nearly or even completely exhausted of mucilage by repeated immersion in water and again drying, will continue to swell on such immersion. This swelling he regards as being due to the ability of

the secondary membrane to absorb water and thereby acquire a certain rigidity and expansion. Regarding the cell-contents, no sugar could be detected in the dry stems, but in the living plants it could be determined during the month of May. The presence of fat was negatived; nor could any crystalline formation be determined either in the dried or living stems. But if the fresh material is placed in alcohol, abundant single crystals of calcium oxalate are separated in the cells of the medullary layer.—Schw. Wschr. f. Chem. u. Pharm., xlviii (1910), No. 35, 540.

BACILLARIÆ

Bacteria and Moulds—Action of Sulphurous Acid.—According to the researches of Hugo Kühl, the presence of sulphurous acid compounds exerts no influence on the development of bacteria. The use of sodium sulphite as a preservation of meats is simply confined to the maintenance of their red color, but has no influence whatsoever on retarding decay.—Pharm. Ztg., lvi (1911), No. 61.

Bulgarian Milk Bacillus—Antagonism to the Common Bacillus of Cholera.—G. Rosenthal states that the acid secretion of the Bulgarian milk bacillus is fatal to the cholera vibrio. Milk clotted by the action of the Bulgarian ferment is therefore an ideal food for use during a cholera epidemic. Since it seems to be established that Asiatic cholera only gains a footing in the human organism through the digestive organs, the author concludes that the two essential precautions to take during an epidemic are to wash the hands and to take milk which has been inoculated with the Bulgarian bacillus.—Pharm. Journ. and Pharmacist, Febr. 4, 1911, 133; from Journ. de Pharm. et Chim., 1911, *3*, 37.

Kefir Grains—Constituents.—O. Tunman has subjected the constituents of kefir grains to systematic study. As is known, the chief constituents of these grains are *Saccharomyces Kefir* and *Bacillus caucasicus* (*Disposa caucasica*), whilst *Streptococci* species are present in a more limited degree. This study of *Saccharomyces Kefir* demonstrated the absence of cellulose in the membrane, which however contained variable but small quantities of chitin. On the other hand, the membrane of *Bacillus caucasicus* contained neither cellulose nor chitin. No conclusive results were obtained in these respects in the case of the *Streptococci*.—Schw. Wschr. f. Chem. n. Pharm. xlviii (1910), No. 35, 537.

FUNGI

Aspergillus Niger—Direct Growth from a Glucoside.—H. Hérissey and C. Lebas have succeeded to cultivate *Aspergillus niger*, starting with the conidia of the fungus in a neutral nutritive medium, in which sucrose was replaced by the glucoside aucubin. While at first growth was very slow, it became more and more rapid, until finally it was luxuriant. It is evident that aucubin cannot be assimilated, as such, by the growth. It can only

be used in the nutrition of the plant after it has undergone hydrolysis. This hydrolysis can only occur, in the neutral medium employed, when the vegetable tissues are able to furnish sufficient enzyme (emulsin in the present instance), to effect this hydrolysis. Consequently, as the plant grows, so its supply of nutrient assimilable material becomes more abundant. It has not yet been decided if aucubigenin formed, as well as sugar by this hydrolysis, is simultaneously assimilated by the plant. It is demonstrated, however, by these experiments that a mould may be grown directly from a glucoside, without the intervention of a carbohydrate.—Pharm. Journ. and Pharmacist, July 29, 1911, 137; from Journ. de Pharm. et Chim., 1911, *3*, 521.

Dried Yeasts—Approximate Estimation of Activity.—Dr. C. Stephan, who has found many of the commercial forms of dried yeast to be deficient in fermentative activity, and increasingly so according to age, suggests the following simple method for the approximate valuation of such preparations by pharmacists who are not provided with the special apparatus usually employed for making the fermentative test:—The cork of a 125 Cc. flask is perforated with a red-hot needle and a capillary tube inserted into the orifice. A trituration of 10 Gm. of fresh yeast (containing about 2.5 Gm. dry substance) and 25 Cc. of a 10 per cent. solution of glucose is then introduced into the flask, the cork is inserted, and the flask and contents are weighed. By frequent weighing the end of the fermentative action is thus ascertained, this usually taking about nine hours. The experiment is then repeated, using 2.5 Gm. of the dried yeast (deducting 8 per cent. of water), and weighing after 24 hours. In an actual experiment, the loss of CO_2 in the case of the fresh yeast after nine hours amounted to 0.9 Gm., while the loss in the second experiment, after 24 hours, amounted to only 0.2 Gm.—Apoth. Ztg., xxvi (1911), No. 72, 766.

Alcoholic Ferments—Influence of Nitrates.—E. Kayser has studied the influence of nitrates on alcoholic ferments. He finds that fermentation is more complete in presence of manganous nitrate, and there seems to be a maximum amount of salt which induces the maximum amount of diastatic activity for each kind of yeast. Too great a quantity of nitrate hinders fermentation. Manganese nitrate acts more energetically than an equal amount of potassium nitrate.—Chem. News., Jan. 6, 1911, 12; from Compt. rend., *151* (1910), No. 19.

Ergot—Review of its Chemistry.—Passing in review the more recently published results of the investigation of ergot, Bridel states that these show that the chemistry of the drug is less complex than was thought formerly. All such old names as "cornutine," "sphacelotoxine," and ergotinic acid should be eliminated, since they represent indefinite substances, and only tend to complicate the nomenclature of the products of the drug. Ergot

owes a part of its activity to two alkaloids, ergotinine and ergotoxine, the molecular structure of which is not yet elucidated. These appear to be more complex bases than the alkaloids found in the higher plants. They are closely related, ergotinine being the lactone, or lactam, of ergotoxine. Ergot is distinguished from other drugs by containing substances which have not been isolated in other members of the vegetable kingdom. Such are Tanret's ergothioneine, a sulphur-containing base, and certain more or less simple amines, derived from amino-acids by loss of carbonic acid. Similarly bases are known to result from the putrefaction of albuminoids, and these amines of ergot may be products of putrefaction. This theory is supported by the fact that β-aminethylgyoxaline has been isolated from a dialyzed extract of the drug. Barger and Dale consider that the chemical products of ergot are more nearly allied to those of the bacteria than to those of the fungi or higher plants.—Pharm. Journ. and Pharmacist, Nov. 18, 1911, 667; from Journ. de Pharm. et Chim., 1911, *4*, 306–346.

Ergot—Review of the Chemical Work Done on the Active Principle.—Prof. Alfred C. Crawford, of the Pharmacological Laboratory, Leland Stanford, Jr., University, introducing a very comprehensive review of the chemical work done on the active principle of ergot, observes that the biological method of testing ergot has been much discussed in recent years, but that for a long time the majority of investigators rested content in the belief that the principle which produced the bluing of the cock's comb was the one to which the therapeutic action of ergot was due, and that on this basis the drug could, at least approximately, be standardized for clinical usage. Later investigations tended to discredit this view, suggesting that the principle or principles which induce uterine contractions may not necessarily be those which cause bluing of the cock's comb, and that the latter may have a subordinate rôle in medicine. In fact, our knowledge of the active principles of ergot has been based largely on so-called pharmacological isolations, which have not answered strict chemical requirements. To form any accurate idea as to the methods for the standardization of ergot it is necessary to know something of the historical development of the work done or the isolation of the active principles, and this knowledge the author endeavors to supply in a review covering 72 bibliographic references to the very much larger number of articles, which have appeared mainly since Stearn's article appeared in 1807. Unfortunately various investigators have used the same name for different preparations, and have used different biological tests as their guide in determining the activity of such preparations, so that, for clearness the author found it necessary to discuss in some detail the work of each, although the names of these workers are now unimportant.—Summing up Prof. Crawford says:—

"Investigators have long recognized in ergot the presence of two bodies which have been designated as alkaloids. The specific alkaloid, ergo-

toxin, is present in such small quantities in ergot that we cannot trace the entire therapeutic action of ergot to this compound alone. It would be well to decide whether the action of ergotoxin is not really due to an amino group. The evidence at present points to the fact that ergot owes its activity to the presence of various basic amino compounds, and this is supported by the fact that only fresh ergot is official in certain pharmacopœias, as it is known that ergot rapidly degenerates with the formation of tri-methylamine. It is interesting to note also that practically every preparation introduced by chemists or pharmacologists has been endorsed by some clinicians as useful in labor," and that

"According to the latest view, the action of ergot in bluing the cock's comb is due to ergotoxine, while the blood-pressure-raising action is mainly due to p-oxyphenylethylamine, although ergotoxine plays a part in it.

"The important problem now is whether ergotoxin, on decomposition, will yield these various pressor amines, and if not, are they all decomposition products of a common mother substance? Should this be so, this body remains to be isolated."—Amer. Journ. Pharm., April, 1911, 147–171.

Ergot—Active Constituents and Assay.—A. Kazay contributes an interesting paper on the active constituents of ergot and their assay. According to Faucet, Kobert, and Keller, the chief active constituent of ergot is the white crystalline substance ergotinine, $C_{35}H_{40}N_4O_6$. For the detection of this substance the Hungarian Pharmacopœia adopts Keller's test, which is as follows: The substance is dissolved in concentrated acetic acid containing a little ferric chloride, and concentrated sulphuric acid poured on. A violet-blue layer is formed at the surface of separation of the two liquids. Ergotinine is an unstable substance, and in presence of moderately concentrated acids changes into cornutine, an amorphous water-soluble body, which gives a red iridescent layer by Keller's test. The author was unable to get anything but the red color of cornutine by Keller's test when using commercial preparations of ergot which had been exposed for some time to a high temperature in the process of manufacture. In order to investigate the relationship of cornutine to ergotinine the author prepared an extract by Keller's process. The colored layers obtained by the above test were examined spectroscopically. With cornutine an absorption band in the blue portion of the spectrum is obtained, and this was readily observed when testing commercial extracts. The preparation made by Keller's method gave a violet-red layer, and showed an absorption band in the yellow near the D line, which, however, quickly disappeared, to be replaced by the line characteristic of cornutine. Ergotinine thus appears to be absent from most commercial extracts. The parahydroxyphenylethylamine of Barger and Dale is probably a decomposition product of ergotinine or of proteid matter. Several other active constituents of ergot have been described, but none gives any

characteristic reaction which might be used to detect the presence of ergot. For this purpose the presence of the coloring matter sclererythrin must be proved by a spectroscopic examination. For the assay of ergot preparations the author recommends extraction with ether after treatment with alkali and determination of the nitrogen in the residue from the ethereal extract, by a modification of Kjeldahl's method.—Pharm. Journ. and Pharmacist, April 15, 1911, 499, from Ztschr. d. Allgem. Oesterr. Apoth. Ver. (1910), 547.

Ergot—Valuation of Activity of its Preparations.—After enumerating the constituents of ergot mentioned in the literature, Andreas Kazo points out the difficulty of accurately isolating and determining them, the more particularly because the chemical reactions proposed for their identification are not unquestionably characteristic. According to his own investigations, ergotinine is converted by the action of acids into cornutine, which explains why in most of the ergot extracts no ergotinine can be detected. The author recommends the estimation of the active (alkaloidal) constituents by treating the preparation with caustic alkali solution, extraction with ether, and, after evaporation of the ether, converting the residue with concentrated sulphuric acid, by Kjeldal's method, into ammonium sulphate ; then, after neutralization of the acid, adding Nessler's reagent until a yellow color appears, and titrating back with volumetric solution of ammonium sulphate. The amount of nitrogen consumed in the ammonium sulphate up to the change of color represents the content of cornutine or ergotinine in the sample, the calculation being made on the basis of 83 Mgm. of ammonium sulphate as the equivalent of 620 Mgm. of ergotinine.—Pharm. Ztg., lvi (1911), No. 3, 26 ; from Zschr. d Allgem. Oesterr. Apoth. Ver. 1910, No. 51.

Ergot—Comparative Value of Chemical and Biological Methods of Standardization.—In his highly interesting paper on the biological standardization of drugs (which see), Dr. Worth Hale describes some comparative experiments to determine the values of the standardization of ergot by chemical and by biological methods. He says at the outset that, while for digitalis chemical methods may at some time be available, it seems absolutely unlikely that a chemical assay will ever show the therapeutic activity of ergot. He reviews some of the chemical methods which have been suggested, as well as the three biological methods in vogue, and records the results of experiments which show the latter depending respectively upon : (1) the production of a characteristic bluing or gangrene of the cock's comb, (2) the amount of rise in blood pressure as the result of a dose, and (3) by its effect upon the uterus of animals. The three biological methods showed a very fair agreement. Contrary to the belief that the cock's-comb method would not give concordant results, it was a surprise that throughout the series of experiments there appeared

to be almost exact parallelism between this method and the uterus method. The blood-pressure method was also generally concordant but in certain instances showed wide variations. Two chemical methods tried did not show any definite relation to the biological methods, although there was some agreement. The cornutine method of Keller more closely paralleled the biological tests than did the benzole-extractive method of Wood (which see). Nevertheless, there is sufficient evidence to show, even if the relation is not an exact one, that there is a fairly close correspondence, and the author is convinced that the adoption of any one of the methods will result in the production of infinitely more uniform preparations of ergot than can now be obtained.—Amer. Journ. Pharm., March, 1911, 107–111.

Boletus Edulis—Basic Constituents.—It has been asserted that choline, a decomposition product of lecithin, is a regular constituent of edible fungi, but an examination of the bases existing in *Boletus edulis*, by K. Yoshimura, showed that choline was not present, although trimethylamine was present to the extent of 0.015 per cent. of the air-dry substance, and this may have been formed by the decomposition of choline into trimethylamine and glycol ($Me_3N(OH)C_2H_4OH = NMe_3 + CH_2OH.CH_2OH$). Other bases present were adenine 0.012 per cent., and histidine 0.014 per cent.; arginine was absent. The total nitrogen was 5.67 per cent. of the dry substance, 3.67 per cent. being present as protein, and only 0.84 per cent. in a non-proteid form precipitable by phospho-tungstic acid.—Pharm. Journ. and Pharmacist, Oct. 15, 1910, 465; from Zschr. f. Untersuch. d. Nahr. u. Genussm., Aug. 1, 1910, 153.

Lactarius—A New Fatty Acid, "Lactarinic Acid," in several species, which see under *Fixed Oils and Fats*, under "Organic Chemistry."

Pleurotus Cretaceus—An Indian Edible Mushroom.—David Hooper has subjected an Indian edible mushroom from Peshawer, where it is known as "Dhingri," to proximate examination. This mushroom is described by Mr. Masser, of Kew Gardens, as *Pleurotus cretaceus*, and is very remarkable, being entirely creamy-white, very rigid when dry, and looking exactly like a plaster-of-paris model. Before cooking, it is, according to Dr. Watts, soaked in fresh water for about 8 hours, whereby it swells and becomes pulpy. Analyzed by Mr. Hooper in the usual way as a foodstuff, the proximate composition of the dry fungus is as follows: Moisture, 12.25; albuminoids (containing 3.40 per cent. nitrogen), 21.25; carbohydrates, 54.70; crude fibre, 3.05; ash (containing 1.85 phosphoric anhydride), 8.75 per cent. The fungus, which is sold by the shopmen much broken, is esteemed as a rarity, and is sent as presents to friends all over India.—Chem. News, Sept. 22, 1911, 145.

LICHENES.

Lichens—Constituents.—O. Hesse, in continuation of the systematic examination of lichens which he has conducted for many years, publishes some further data on the chemistry of the lichens. *Evernia divaricata* contains divaricatic acid, $C_{21}H_{24}O_7$, occurring in delicate white silky needles. This is decomposed by excess of alkali into divaricatinic acid, $C_{11}H_{14}O_4$; divarin, $C_9H_{12}O_2$, and carbonic acid. Divaricatinic acid occurs in fine, long needles; divarin in pale, reddish needles containing one molecule of water. *Evernia furfuracea*, var. *cerata*, yields physodylic acid; *Evernia furfuracea*, var. *olivetorina*, gives olivetoric acid, $C_{21}H_{26}O_7$. *Cetraria terrestris* contains chrysocetraric, vulpinic, and small traces of lævo-usonic acids. *Cetraria glauca*, as stated by Zopf, contains atranorin and caperatic acid. *Sticta pulmonaria* yields stictaic acid, $C_{19}H_{14}O_9$. *Parmelia saxatilis* contains usnetic and parmatic acids. The Californian *Rocella peruensis* has been stated to contain orcin, but this has not yet been found in it by the author.—Pharm. Journ. and Pharmacist, March 4, 1911, 297; from Journ. f. pract. Chem., *83* (1911), 22.

FILICES.

Folium Adianti—Anatomical Structure and Constituents.—The fronds of *Adiantum Capillus Veneris*, L. constitute a very ancient drug, which at the present time is supplied mostly from Italy. O. Tunmann gives a pharmacognostic and macroscopic description of the drug, devoting particular attention to the microscopic study of the reactions of the cell contents with chemical reagents. The older authorities mention sugar, tannin and bitter principle as the principal constitutents of the leaves. According to the author, however, the leaves contain also an aromatic body possessing close analogy with coumarin. On heating the leaves, a crystalline sublimate is obtained, which corresponds in form to that of coumarin, dissolves without coloration in sulphuric acid, and dissolves very readily in chloroform and in ether-alcohol. Nevertheless, they differ from coumarin by being odorless, or nearly so; they do not dissolve in zinc chlor-iodide, and do not give with this reagent the characteristic reaction of coumarin described by Senft. Moreover, benzoic acid and vanillin are also excluded, and further experimentation is therefore necessary to determine the nature of these adiantum crystals.—Schw. Wschr. f. Chem. u. Pharm., xlviii (1910), No. 49, 749.

Penghawar Djambi—Related Plants and Sorts.—O. Tunmann mentions that the name "Penghawar Djambi" is customarily applied to the chaffy hairs, varying from a metallic lustrous golden-yellow to copper color, which are laterally attached to the stems of a number of tree-ferns indigenous to the Asiatic archipelago and Polynesia, and used medicinally as haemostatics. According to botanical source and locality of production, three sorts are distinguished in commerce, namely: "Penghawar Djambi," from

Cibotium boronetz and *C. glaucescens*, in northeastern Sumatra; "Pulu," from *Cibotium glaucum*, in the Sandwich Islands; and "Pakoe" or "Paku Kidang," from *Alsophila herida* and other species, in Java. The author's investigations have determined that no starch, or at most extremely seldom, is found in "Penghawar Djambi"; that "Pulu" contains some flat, oval or elongated starch granules; but that "Paku" contains the largest quantity, the granules being also the largest, roundish, and often contained to the number of 20–30 in a cell. The membrane of the hairs, in distinction from those of *gossypium*, is composed in the young hairs and hair-cells of an inner lamella, which is built up from traces of cellulose and larger quantities of pectin substances, and is rapidly transformed into a strong cuticle. In the older cells the cutin-content increases to such an extent that the membrane is composed only of an extremely tender inner lamella and a strong and resistent cuticle. The coloring matter of the three sorts is evidently identically the same.—Schw. Wschr. f. Chem. u. Pharm., xlviii (1910), No. 43, 661–667.

CYPERACEÆ.

Papyrus Plants—Indigenous Occurrence along Cayane River in Sicily.—Dr. P. Siedler gives an interesting account of a journey to one of the few localities in which the plant producing the "papyrus" of the ancients, botanically known as

Cyperus Papyrus, L. (*Papyrus antiquorum*, Willd.), is still found. The plant is said to have disappeared completely from Egypt, but along the Cayane, a river which empties along with the Arapo into the basin of the "Ports grande" of Syracuse, in Sicily, it is still found and, particularly at the head waters, in great profusion, forming dense thickets on both sides of the river and surrounding the peculiar basin, "La Pisma," which forms the source of the river. These plants, rising from the water in straight stems to the height of 5 meters, are surmounted by a wealth of flowers in form of graceful plumes, and afford a novel and magnificent feature of the landscape. The stems are blunt, three-cornered and have a circumference of about 18 Cm. at the base, tapering to the apex from which the plumes expand to the number of more than 100 rays. The boatmen illustrate the manner of making the sheets of "papyrus," by splitting sections of the stem deprived of the sheath and about 30 Cm. long into strips about 20 mm. thick, and plaiting these strips into a mat or sheet, which when flattened out under pressure forms a sheet of papyrus suitable for receiving inscriptions or for decoration with drawings and painting—such decorated sheets being offered for sale in the stores of Syracuse as mementos. While it is permitted to take samples of the papyrus plants, cut off above the roots, from the country, it is not permitted to take plants abroad with the living roots attached.—Pharm. Ztg.. lvi (1911), No. 63, 634–635.

GRAMINACEÆ.

Andropogon Citratus—Volatile Oil from the Tubers and Rhizomes.—From the tubers and rhizomes of *Andropogon Citratus* whilst oils have been distilled by the chemists of the Agricultural Department at Buitenzorg which had the constants exhibited in the following table:

	Oil from the tubers.	*Oil from the rhizomes.*
Yield	19 Cc. from 8.2 kilos	0.2 per cent.
Sp. Gr. at 20°		0.95
Opt. rotation	1040′	304′
Citrate content	82 per cent.	11 per cent.

—Schimmel's Rep., April, 1911, 79: from Jaarbock van het Dept. van Landbouw in Nederlandsch-Indie, 1909, 64.

Andropogon Schoenanthus subspec. Nervatus, Hack—Yield and Character of Volatile Oil.—Some time ago Schimmel & Co. received from the Committee for the Economic Development of the German Colonies (Kolonialwirtschaftliches Komitee) in Berlin a small parcel of a grass grown in the Soudan, of which Dr. Giessler, Curator to the Botanical Institute at Leipzig, named *Andropogon Schœnanthus* subspeci. *nervatus*, as the parent plant. From this grass they distilled 1.9 per cent. of a brownish-colored oil which, although possessing a certain resemblance to the commercial distillates of gingergrass, would be unable to compete with the latter on account of its faint odor. The constants of the oil were as follows: $d_{15°}$ 0,9405, a_D + 26° 22′, $n_{D20°}$ 1,49469, sap. v. 4,6, ester v. 9,3, ester v. after acetylation 99,1, sol. in one-half its vol. and more of 80 per cent. alcohol. Paraffin separates out from the solution when diluted.—Schimmel's Rep. April, 1911, 19.

Mana-grass—Varieties, Yield and Character of Volatile Oils.—Of mana-grass, which probably constitutes the mother-plant of citronella-grass, Stapf distinguishes two varieties: *Cymbopogon nardus* var. *Linnæi* (typicus) and *C. nardus* var. *confertiflorus*. In Ceylon the natives differentiate still further, having a series of names for each slightly different plant, but Stapf traces all these back to the two varieties mentioned. The oils of these two grasses have no attributes which are characteristic for each particular variety; on the contrary, in both cases the same range of differences in yield and properties of the oils distilled at different times is observable, and this is probably correlated to the mode of cultivation and manuring, as well as to the season when the oil was distilled.

The oils were distilled by J. F. Jowitt, of Bandarawela, Ceylon, and examined at the Imperial Institute in London, by Samuel S. Pickles. The yields varied from 0.06 to 0.45 per cent.; they were at their lowest in grass distilled in May, the succeeding months, generally speaking, producing a larger yield. All the oils ranged in color from bright to deep

yellow, and with few exceptions they had an agreeable citronella-like odor, although mostly a little acrid. They gave a clear solution with 1 to 1.4 volumes of 80 per cent. alcohol. When 10 volumes of the solvent was added the solution showed a more or less marked opalescence, and in two cases a slight turbidity. The constants of the two oil-varieties lie within the following limits:

	Oil of C. Nardus var. *Linnæi*	*Oil of C. Nardus* var. *confertiflorus*
$d_{15°}$	0,894 to 0,926	0,900 to 0,929
a_D	+ 4°54′ to — 6° 32′	+12° 12′ to — 2° 11′
Total geraniol	43,5 to 64,7%	39,1 to 64,2%

—Schimmel's Rep., April, 1911, 48–50; from Bull. Imp. Inst., 8 (1910), 144.

Grain—Action of Hydrochloric Acid on the Hairs of Different Sorts.—L. Rosenthaler finds that if the hairs of wheat are immersed in concentrated hydrochloric acid (sp. gr. 1.19), bands are developed in some of them (not all) which spirally encircle the whole or only a portion of the hair. In typical cases the formation of spirals begins immediately and is completed in a short time. This phenomenon is conveniently observed under the microscope if a section of the crown of a wheat fruit with hairs is immersed in water and, after drawing off the water, hydrochloric acid is allowed to flow on the section. The hairs of other grains—rye and barley—do not have this property of forming spirals by the action of hydrochloric acid, and the observation therefore is of some diagnostic importance, since it may serve for the distinction of grains from each other, and particularly of rye from wheat grains. If under the conditions described the formation of spiral bands encircling the hairs is observed, the presence of wheat hairs may be accepted as proven.—Pharm. Ztg., lv (1910), No. 93, 936; from Ber. d. D. Pharm. Ges., 1910, No. 7.

Malt—Determination of Sulphur.—Otto Reinke observes, that if an aqueous extract of malt is made by treating 100 Gm. of the whole grain with 300 Cc. water, and after three hours filtering off 200 Cc., then adding zinc and sulphuric acid to the filtrate, the gas evolved, when passed through lead paper will often produce a brown coloration after from ten to sixty minutes. This, however, is not always due to sulphur in the malt; the brown stain on lead paper, in fact, is sometimes produced in fifteen minutes by malt that shows no sulphur by the following positive test, which is recommended by the author:—Acidify the 200 Cc. of filtrate, obtained as above, with phosphoric acid and distill it in a current of carbon dioxide, receiving the distillate in a solution of iodine. The sulphurous compounds in the malt are thus converted into sulphuric acid which is precipitated by barium chloride and weighed, and the figure, corrected for any sulphur previously existing in the iodine solution, shows the

amount of sulphite that was present in the malt.—Pharm. Journ. and Pharmacist, Dec. 31, 1910, 788; from Chem. Ztg., Nov. 1, 1910, 1159.

"*Sleepy Grass*" (*Stipa Vaseyi*, Scrib.)—*Histological Study.*—A number of species of *Stipa* are known among the grasses that are poisonous when eaten by cattle. They are distributed in various parts of Asia, South and Central America, and in the United States and Mexico. The species found in this country is the so-called "sleepy grass," to which (1898) Scribner gave specific rank as *Stipa vaseyi*, which is the subject of a histological study by Oliver A. Farwell. This plant is a stout, leafy, densely tufted, perennial grass four to six feet high, with broad, loose and overlapping lower sheaths, longer than the internodes, and bearing broad, flat leaves often two feet long; the upper sheaths are smaller and stouter than their respective internodes, bearing smaller, often involute leaves; the culm is terminated by an erect, dense panicle from six to eighteen inches long; spikelets about three-eighths of an inch long, the glumes minutely scabrous on the back and acuminate; flowering glume pubescent; awn one-half inch to an inch and a half in length, twice bent and twisted up to the second bend; callus densely hairy, acute. *Stipa vaseyi* grows throughout the southwestern part of the country, or from Colorado to California and southward into Mexico, but it is only from Mexico and New Mexico that the reports of its poisonous character have come. This grass is eaten readily by stock that is unfamilar with it, and from its property of putting to sleep any animal that has eaten it, it has come to be known generally as "sleepy grass"; another name is "bunch grass." Common report says that animals eating it will go to sleep for from one to three hours, when they wake up and eat more, resulting in another sleep, and this program is repeated until thirst drives the animal to water. Horses sleep standing with feet braced wide apart and head on about a level with the shoulders; cattle and sheep, on the other hand, lie down to sleep. The histological elements of this interesting grass are described by the author and shown in a number of photo-micrographs.—Merck's Rep., October, 1911, 271–273.

Bamboo—Cyanogenetic Glucosides in the Young Shoots.—O. Walter, T. Krassnosselska, N. Maximow and W. Maltschewski, have determined in the various species of *Bambusa* occurring in Java, considerable quantities of hydrocyanic acid, in form of cyanogenetic glucosides, which are found particularly in the young shoots of the plants.—Pharm. Ztg., lvi (1911), No. 57, 577; from Bull. Acad. St. Petersb., 1911, 397–426.

PALMACEÆ.

Attalea Excelsa—Chemical Examination of the Fruit.—F. Franz and Gnaedinger observe that the fruits of *Attalea excelsa* are used under the name of "Urukuri nuts" for burning to cure Para rubber by means of the smoke produced. The high quality of this rubber is attributed to this

smoke, and the investigation was made to see if the presence of any particular constituents could be established, which would account for this supposed action. The kernels of the nuts gave to chloroform 73.5 per cent. of a butter-like fat, which had the following characters: Specific gravity, 0.9012 at 11° C.; solidifying point, 16–17° C.; melting-point, 18–19° C.; Reichert value, 10.5; acid value, 12.96; saponification value, 348.3; iodine value, 16. The solid glycerides, consisting of 56.8 of the total fat, are separated by treating the fat with water at 20° C. The fatty acids present comprise a small amount of butyric, and larger quantities of capronic, caprylic, caprinic, lauric and myristic acids. Glycerol was the only alcohol detected. In addition to the fat the nuts contain an alkaloidal substance occurring in pearly scales, decomposing at 287° C. without melting. The overpowering odor of the nuts is probably due to a ketone of the terpene series. An examination of the tar, produced by the destructive distillation of the woody portion of the fruit, shows it to have much the same constitution as beechwood tar.—Pharm. Journ. and Pharmacist, Mar. 25, 1911, 399; from Grimm's Ztg., *24*, 1328; through Chem. Zentralbl., 1911, 401.

Betel Plants—Cultivation in Tonquin.—H. Gilbert describes the cultivation of the betel as conducted in the province of Thanh-Hoa, Tonquin. According to this author there are two varieties of the plant, of which one attains a height of from 6 to 9 feet and the other of up to 30 feet. The last-named is the cultivated variety. The betel-plant grows best on rich soil, such as the loamy borders of rivers. As the condition of the leaves is the principal consideration when the crop is gathered and as the leaves are very sensitive to the influence of the weather, it is necessary to protect the plants against wind and sun, for which reason they are grown under large shelters, built of bamboo sticks and covered with bamboo-matting. These shelters being rather expensive to construct and to keep in repair, the cultivation of the betel-plant is somewhat restricted. The plant is propagated from cuttings which are planted out in holes from 4 to 6 inches deep, and staked to the bamboo-sticks which form the support of the shelter. Planting takes place in March, April, or May, and the crop may be gathered the same season. Oil-cake, especially cotton-seed cake, is used for manuring.—Schimmel's Rep., Oct., 1911, 24; from Journ. d' Agriculture tropicales, *11* (1911), 227.

Cocoanut Butter—Presence and Characters of Volatile Oil.—A. Haller and A. Lassieur have demonstrated by their experiments that crude cocoanut butter (coconut oil, from *Cocos nucifera*) owes its peculiar odor to an essence (volatile oil) of which the two principal constituents are methyl ketone and methylnonyl ketone. The butter retains traces of these ketones even after careful purification, and they may be detected by their odor when the butter is heated. The essence also contains small quantities of

an aldehyde which has not been isolated. It causes rotation of the plane of polarization. Essence of rue (*Ruta graveolens*) contains the same ketones. When methylnonyl ketone is hydrogenated in presence of reduced nickel at 250—300° C. it is partially transformed into a hydrocarbon, C_9H_{20}, which is less rich in carbon than the original ketone, and a pinacoline, $C_{22}H_{44}O$. This is, to the author's knowledge, the first case of the formation in similar conditions of a pinacoline of such high molecular weight.—Chem. News, July 8, 1910, 24; from Compt. rend., 1910, No. 17.

The Sea Cocoanut—Fanciful Properties Attributed Traditionally.—Max Leo, quoting from a recent paper published by E. Blatter, S. J., in the "Journal of the Bombay Natural History Society," describes the sea cocoanut, or double cocoanut, as being the fruit of *Lodoicea sechellarum*, a palm growing on two little islands of the Seychelles group in the Indian Ocean. The tree attains a height of 25 to 28 meters and bears a crown of fan-shaped leaves 3 to 3.75 meters wide and from 6 to 9 meters long. The heart of the leaves is used as a food, and is sometimes preserved in vinegar for this purpose. The wood of the trunk is employed for the making of water-troughs and palisades, with which the natives surround their houses and gardens, while the foliage serves admirably as a thatch for buildings. From the ribs and fibers of the petiole baskets and brooms are made, and hats from the young foliage. The nuts are shaped into vessels of various kinds. The sea cocoanut has played a rather interesting rôle in the history of botany and materia medica, and a number of interesting legendary traditions are associated with it, the details of which are given in Mr. Blatter's paper. According to this author, a number of writers of the sixteenth and seventeenth centuries were acquainted with the nuts under the names of *Nux medica* and *Cocos maladivus*. From the circumstance that the nuts were often found floating on the surface of the Indian Ocean and near the Maldive Islands, they were called *Coco de mer* by the French, whence our appellation "sea cocoanut." The first European to describe them appears to have been Garcia d' Orta, a Portuguese physician, who spent thirty years in the service of the Viceroy of Goa. While acting in this capacity d' Orta made a study of useful plants and drugs of the country, the results of which he published in 1563 in a work entitled "Coloquios de India." From an edition of d' Orta's book printed in 1605, Mr. Blatter quotes some passages relative to the *Cocos da maldiva*, as the nut was there called. D' Orta states that the kernel, especially, is highly esteemed by the inhabitants of the Maldive Islands as an antidote to many kinds of poisons. He was also told that the nut had proved a valuable remedy in colic, paralysis, epilepsy and nervous diseases; these virtues even extended to water which was kept for some time in the shell, and to which a fragment of the kernel had been added. D' Orta, however, declines to vouch for the truth of these statements; he says that he

had no time to put them to the test, and is therefore not in a position to give an opinion in regard to these claims. He says the common people believe that it grows in the water, hidden from the sight, but the "more devout" maintain that its habitat is an island named Pallayas, "which is invisible to those who want to find it, and visible to others who do not know about it." The ocean currents carry away the nuts from the island and wash them to the shores of the Maldives. Equally extravagant is the hypothesis that the tree from which these nuts are derived has never been seen, since, as stated by William Piso, a Dutch physician and traveler, the tree grows at a depth of sixteen fathoms below the surface of the sea; and Francis Pyrard, who was wrecked off the coast of Maldives in 1601, speaks of the sea cocoanut, which he describes as being of the size of a man's head, and which in form resembled "two melons grown together." But with the discovery of the Seychelles Islands by La Bourdonnais (1743), the tree which had been the subject of so much speculation was found and described, and the wild legends associated with it vanished. In conclusion, Mr. Blatter says: "It is to be regretted that the tree is not cultivated, and that a practice has prevailed of cutting it down in order to get at the fruit and tender leaves; and it is feared that this will lead to the extinction of the sea cocoanut, which will become in reality as rare as it was supposed to be by the travelers who picked up the first known specimens of its nuts floating on the sea.—Nat. Drugg., October, 1910, 462–463.

SMILACEÆ.

Angola Sarsaparilla—Anatomical Comparison with Tampico Sarsaparilla.—C. Hartwich describes the anatomical features of the so-called Angola sarsaparilla, a drug derived from a *Liliaceae* closely related to the genus *Smilax*, and compares these with the Mexican, so-called Tampico sarsaparilla.—Pharm. Ztg., lv (1910), No. 92, 928.

LILIACEÆ.

Convallaria—Early History.—Prof. John Uri Lloyd observes that lily of the valley, *Convallaria majalis*, is recorded as one of the earliest of domestic remedies, being accepted by Dr. Squibb as "continuously used in medicine for several hundred years," while Dr. Edward Drummond, of Rome, states that in a book of "Commentaries on the Materia Medica of Dioscorides," Venice, 1621, Dr. Pietro Andrea Matthioli speaks of its use in cardiac diseases. The drug was not recognized in the U. S. P. until 1900, although a study of its chemistry antedates this official recognition by many years; for in 1858 G. F. Walz published an analysis, describing two most important constituents—*convallarin* and *convallamarin*—stating that his experiments were made long before their publication.—Midl. Drug. and Pharm. Rev., May, 1911, 175.

IRIDEACEÆ.

Iris Versicolor, L.—Chemical Examination of the Rhizome.—Frederick B. Power and Arthur H. Salway have subjected the rhizome of *Iris versicolor*, L., commonly known as the "Larger Blue Flag," to chemical examination. By the successive extraction in a Soxhlet apparatus with various solvents, they obtained the following amount of extract, dried at 100° C.: Petroleum (b. p. 35–50° C.) extracted 1.2 per cent.; ether, 3.2 per cent.; chloroform, 0.9 per cent.; ethylacetate, 1.7 per cent.; alcohol, 16.5 per cent. Direct extraction of 62.82 kilos of the drug by continuous percolation with hot alcohol, yielded after removing the greater portion of the alcohol, a viscid dark colored extract, amounting to 15.72 kilos (= 25 per cent.) A small portion of the ground drug having been tested for the presence of an *alkaloïd*, with negative result, this extract formed the material for the complete examination, which yielded the following constituents: *Volatile oil*, amounting to 0.025 per cent. of the weight of the drug, of a yellow color, a strong, somewhat unpleasant odor, and containing traces of furfuraldehyde; sp. gr. $\frac{20°}{20}$ = 0.9410; optical rotation not appreciable. From the aqueous deep brown liquid (*A*), which was separated from a brown resin (*B*) by filtration, about 0.0019 per cent. of a colorless crystalline substance was isolated and identified as *Isophthalic acid*, $C_6H_4(CO_2H)_2$, a body not heretofore observed as occurring in nature. Besides a number of indefinite, usually gummy and amorphous bodies, the only other substance obtained in a crystallized condition was a large amount of *sugar*, which readily reduced Fehling's solution, and yielded on hydrolysis d-phenyl glucosazone. From the resins (*B*), *Phytosterol* ($C_{27}H_{46}O$), *Myricyl alcohol* ($C_{31}H_{64}O$), *Heptacosane* ($C_{27}H_{56}$), *Ipuranol* ($C_{23}H_{38}O_2(OH)_2$), and *Cerotic acid* ($C_{26}H_{52}O_2$), were isolated and identified. Physiological tests made by Dr. H. H. Dale with the various crude products—the total alcoholic extract, the resin (B) and the aqueous extract (A), showed no signs of activity of the dried drug examined.—Amer. Jour. Pharm., Jan., 1911, 1–14.

MUSACEÆ.

Bananas—Constituents.—K. Yoshimura has investigated the changes taking place in the composition of banana fruit during ripening. Unripe bananas were kept in a warm place, and analysed at intervals of one week. No change in the amount of tannin present took place during the ripening process. The starch of the unripe fruit was found to change first into saccharose, which was afterwards partly or completely inverted by the invertase present. The sugars of the ripe fruit were also examined, but saccharose, glucose, and fructose were the only compounds of this class that could be detected.—Pharm. Journ. and Pharm., June 3, 1911, 741; from Ztscher. f. Unters. d. Wahr. u. Genuss., 1911, 406.

ZINGIBERACEÆ.

Turmeric—Variation in Constituents.—F. H. Alcock submits the results of analyses of many samples of turmeric, from which it develops that the loss in weight of this drug at 212° F. may vary from 8 to 12.5 per cent., while the amount of matter soluble in 90 per cent. alcohol may vary from 2.5 to 9.5 per cent., and the ash from 5 to 7.5 per cent. Moreover, the nature of the ash also seemed to vary; some fused readily and assumed the green tint characteristic of manganese, whilst one sample contained ferric oxide. The material examined was both in wholes, pieces and in powder.—Trans. Brit. Pharm. Conf. (Year-book of Pharm.), 1910, 369–371.

Turmeric—Detection in Powdered Rhubarb.—Dr. E. Richter gives the following directions for detecting turmeric in powdered rhubarb by means of boric acid: Triturate 0.1 Gm. of the powder with 5 drops of a 1 : 30 solution of boric acid which has been acidulated with hydrochloric acid, spread the magma out on a watch glass as far as possible and evaporate to dryness on a water bath. The dry residue is scraped from the watch glass, triturated as fine as possible, a portion of the powder is transferred to an object glass with a drop of liquid paraffin. Under the microscope the presence of curcuma is then distinctly revealed by the red color of the particles, the rhubarb simply retaining a yellowish color.—Apoth. Ztg., xxvi (1911), No. 88, 921.

Queensland Arrowroot—A Product of Canna Edulis.—R. C. Cowley directs attention to Queensland arrowroot which has appeared on the London market, and is derived from the large pumpkin-shaped rhizomes of *Canna edulis*, cultivated for this purpose quite extensively in South Queensland, between Brisbane and the New South Wales border. It is a very pure form of starch and appears to have some advantage in this respect over Maranta (Bermuda) arrowroot, as shown by the following table of comparison supplied by Mr. Brunswick:

	Bermuda Arrowroot.		Queensland Arrowroot.	
	2/6½ per lb.	1/1 per lb.		
Moisture	13.5	15.86	17.36	17.28
Starch	82.24	82.61	81.52	81.87
Ash	0.124	0.172	0.142	0.295
Proteids	0.052	0.087	0.078	0.061
Fiber (by difference)	4.09	1.28	0.092	0.50

—Chem. & Drug., Aug. 6, 1910, 60.

ORCHIDEACEÆ.

Vanilla—Historical Sketch.—Professor John Uri Lloyd traces the history of vanilla from the time when the Spanish conquerors of Mexico learned of its use as a flavor for cacao among the Aztecs, and the plant thus became known to Europe. Hernandez described it in his history of Mexico, both under its botanical name, *Aracus aromaticus*, and the vernacular name, "tlilxochitl," and Clusius mentions it as "*lobus oblongus aromaticus.*" Pomet (1694) reports its use in France as a flavor, and as early as 1721 vanilla was introduced into the London Pharmacopœia; while in the West Indies and the adjoining coast of South America it has long been known. Cultivation experiments were made by a Catholic missionary, P. Labat, who cultivated plants received from Cayenne in Martinique (1697), and later in Guadaloupe. To Humbolt is due the first authentic report on Mexican vanilla. The species yielding the finest flavored vanilla, subsequently named *Vanilla planifolia*, Andrews, was imported from America to England; this flowering in 1807. Specimens of this plant were later transferred to Paris and Belgium, from whence the botanical gardens of Reunion (Bourbon) and Java were supplied. Aside of the earlier Mexican plantations, the plant is now cultivated on a commercial scale in Java, on Reunion, Mauritius, Guadaloupe, Martinique, St. Marie (near Madagascar) and in Tahiti.—Amer. Drugg., May 8, 1911, 276.

Vanilla Beans—Chemistry and Character of Constituents.—Samuel Iserman has written a paper on the chemistry of vanilla beans and the character of its constituents, which deserves more than ordinary consideration, since it is based upon the experience and studies of an expert associated since many years with one of the foremost American firms dealing exclusively in this valuable commodity. He observes preliminarily that in spite of the fact that synthetic vanillin has steadily come down in price until it reached ridiculously low figures, the annual consumption or production of vanilla has increased in a decade (1899–1909) from 273,000 kilos to 532,000 kilos. This is a significant fact, since it proves that there is something in vanilla upon which its special aroma and taste depends in addition to its vanillin content. We know that the nucleus of vanillin preexists in the unfermented plant in the form of a glucoside, which splits up by fermentation and the effect of an oxydase. At the same time other bodies of the phenolic and phenoletheric character are formed, which influence to the greatest extent the real flavor of the vanilla bean. Some of those bodies are already known, but the investigation is enormously difficult, as up to this time no chemist has succeeded in separating them out in crystalline form. The great difficulty encountered by the analytical chemist who tries to determine the chemical character of the vanilla bean flavor is that almost all compounds which are of eminent importance for

the creation of the odor, flavor and bouquet in general, are not well defined bodies, but polymers of highly molecular order, vanillin alone being the exception. These polymers are in a resinified state, and as all resins defy most means of chemical detection, it is almost impossible to determine the exact chemical nature of the vanilla resins. The author has tried all known methods to convert the polymers of the vanilla bean into monomeric bodies, but with no result. He does not believe that the natural flavor will be reproduced artificially before years to come; possibly we could satisfy the sense of smell, but never could we deceive the much higher sense of taste. The flavor of vanilla bean is one of the selected number of natural delicacies for which no artificial makeshift will make good.—West. Drugg., July, 1910, 358–362.

Tahiti Vanilla—Percentage of Vanillin.—H. Gautier and A. Kling have determined the vanillin content in several samples of Tahiti vanilla of good quality, and find this variety of vanilla, when in a moist condition, to contain less than 1 per cent. of vanillin.—Schimmel's Rep., Oct., 1910, 154; from Ann. des Falsification, *3* (1910), 200.

ARISTOLOCHIACEÆ.

Asarum Europœum—Poisonous (Ecbolic) Action of the Volatile Oil.—According to a note in the "Münchener Med. Wochenschrift" (1910, No. 26) a few cases have been observed recently in which the highly injurious action of oil of *Asarum europœum* (i. e. of the asarone contained therein) upon the stomach and the intestines has caused premature delivery in pregnancy.—Schimmel's Rep. Oct. 1911, 21.

THYMELACEÆ.

Lasiosiphon Meissnerianus, Endl.—Chemical Examination of the Root.—Hitherto only a single drug derived from the N. O. *Thymelaeaceœ*, namely the bark of *Daphne Mezereum*, Linné, has received the official recognition of any of the pharmacopœias. Recently however the root of *Lasiosiphon Meissnerianus*, Endl., a South African plant, has attracted some attention on account of its reputed value for the cure of snakebite—one-half to three-quarters of an ounce of the dried root (sometimes both leaves and root) being used in form of infusion. Harold Rogerson now records the results of a chemical examination of the roots of this plant, supplied by Mr. G. E. Oliver, of East London, Cape Colony, which was specially collected for this purpose. From a portion of this material the following amounts of extracts were obtained by successive extraction in a Soxhlet apparatus with various solvents:—Petroleum, 0.80 per cent.; ether, 1.80 per cent; chloroform, 0.40 per cent.; ethyl acetate, 2.40 per cent.; alcohol, 8.40 per cent. For the complete examination, 29.94 kilos. of the ground material was extracted by continuous percolation with hot alcohol, 7.98 kilos. (= 37.70 per cent.) of a dark-colored, viscid extract

being obtained after the removal of the greater portion of the alcohol. This was mixed with water, and distilled in a current of steam for several hours, but no volatile oil or other volatile product was obtained. The residue in the still, consisted of a dark brown resin and a dark-colored aqueous liquid, which were examined separately. The aqueous portion yielded nothing definite besides a reducing sugar (yielding *d*-phenyl glucosazone, m. p. 204°–205° C.) and some tannic matter. The resin, which amounted to 12.3 per cent. of the weight of the drug, was a brown, powdery substance having an irritating effect when inhaled, and a burning sensation when brought on the tongue. The chemical examination revealed the presence of a phytosterol, oleic, palmitic, formic and butyric acids, a small amount of a fatty acid of a higher degree of unsaturation, and a small amount of an exceedingly unpleasant odorous amorphous product.—Amer. Journ. Pharm., Febr. 1911, 49–65.

LAURACEÆ.

"*Anise Bark*"—*Botanical Source*.—When, in 1892, Schimmel & Co. distilled a bark from Madagascar which was described as "anise bark" (see Proceedings, 1892, 786) they could give no particulars as to the botanical origin of the material, and could only express the surmise that it might possibly be derived from a species of *Illicium*. Dr. Giessler, Curator of the Botanical Institute of the University of Leipzig, has now ascertained, after careful examination of the bark, that it is the product of

Persea gratissima, Gaertn. (N. O. Lauraceæ), known by the common name of "Avocato Pear," a tree having its original habitat in tropical America, but which is now much cultivated throughout the tropics, including East Africa and Zanzibar. Schimmel & Co. recall that the bark yielded 3.5 per cent. of a light yellow oil, which, in addition to a small proportion of anethol, consisted mainly of methyl chavicol. The leaves of *Persea gratissima* contain an oil of similar constitution, as reported by them in 1894.—Schimmel's Rep., Oct., 1910, 19–20.

Camphor Trees—Abundant Occurrence in German East Africa.—D. E. Hutchins, lately Conservator of Forests, communicates some interesting information on the natural occurrence of camphor trees in German East Africa. According to this authority, the camphor tree is abundant and shows a good natural production in a forest situated in the neighborhood of Wilhelmstal and leased by a Mr. Wiese. At one place in the West Usambara Mountains, for example, Hutchins counted 26 seedlings of camphor on 20 square yards. Their appearance, he states, was more vigorous than that of the suckers which constitute 99 per cent. of the reproduction in British East Africa. Unfortunately, Hutchins omits to state whether the tree is botanically allied to the true camphor tree (*Cinnamomum camphora*). Hutchins regards it as curious that neither the botanical staff at the Imperial German Biological-Agricultural Institute

at Amani nor the forest officials at Wilhelmstal had recognized the tree.—Schimmel's Rep., Oct., 1911, 27; from Agric. Journ. Brit. East Africa, through Chem. & Drug., *79* (1911), 18.

Camphor Trees—Distribution in Formosa and Output of Products.—According to a report by the British Consul in Formosa, the available supply of camphor trees in the settled districts of the island is steadily decreasing, but new plantations are being laid out in suitable spots, and it is hoped that a campaign against the savages will throw open fresh areas of trees to exploitation. For the current year (1910) the Monopoly Office has limited the output of camphor to 6,670,000 lbs. of camphor and 7,335,000 lbs. of oil—the exportation of camphor to various countries exceeding the amount mentioned by 660 lbs., whilst only 4,795,907 lbs. of camphor oil have been shipped—the latter going entirely to Japan for working up into camphor, of which the oil contains 40 per cent. The preparation of camphor from the leaves is still in the experimental stage. Incidentally, Schimmel & Co. draw attention to the reference in the Consular Report to a species of camphor tree abounding in the mountainous regions of Formosa, of which the oil is said to be "employed in Europe and America as a most valuable base for perfumery purposes," and they express the opinion that this "mysterious oil" is evidently identical with linaloe oil from Formosa mentioned elsewhere in this report: but for a disclosure of its nature and botanical origin we must look to the future.—Schimmel's Rep., Oct., 1910, 26; from Journ. Soc. Chem. Industry, 1910, 976.

Camphor—Yield from Different Parts of the Plant.—Experiments conducted in Jamaica and Antigua, and in the Federated Malay States, show that the youngest parts of the plant give the greatest yield of camphor. In connection with this result a note in the "Planters' Chronicle" for December 17, 1910, based on information contained in "Der Pflanzer" (1910, 6, 86), states that experiments made at the Biological Agricultural Institute at Amani, German East Africa, showed that young twigs and leaves are richer in camphor than the wood. The trials were carried out with about 3,500 trees, mostly three and a half years old, a few being older than this. The trees were cut back to about one-third of their height, without ill effect. The investigations showed that the young twigs and leaves yielded on the average about 1.2 per cent. of distillate, containing 0.8 to 0.9 per cent. of camphor and 0.3 to 0.4 per cent. of oil, from the latter of which camphor could still be obtained on a large scale; the yield of camphor is therefore estimated at 1 per cent. The results were very different with woody branches, as these yielded only about 0.16 per cent. of distillate, consisting of 0.06 per cent. of camphor and nearly 0.1 per cent. of oil. The advice is therefore given that, in growing camphor trees, large leaf formation should be aimed at as far as possible. It is also best to

distil during dry weather. There is no definite difference between the yield of camphor from leaves and twigs, whether these are collected from low or high altitudes.—Pharm. Journ. and Pharmacist, April 1, 1911, 433; from Agric. News, February 18, 1911, 56.

Camphor—A Constituent of the Leaves of Cinnamomum Glanduliferum.—R. S. Pearson, of Dehra Dun, has obtained from the leaves of *Cinnamomum glanduliferum*, a laurel-tree growing in the districts south of the Himalayas, a camphor which must probably be regarded as identical with the Japanese product. A sample sent by Mr. Pearson to Schimmel & Co. had the following properties: M. p., 175°, raised to 176° after recrystallization from diluted alcohol. So purified it had a specific rotation in 55·55 per cent. alcoholic (90 per cent.) solution of + 46° 32′. Its oxime melted at 118° and, as was to be expected, rotated to the left. It is evident that the sample consisted solely of d-camphor, since no alcoholic constituent, such as borneol, could be detected when the crude product was boiled with acetic anhydride.—Schimmel's Rep., Oct., 1910, 145.

Camphor Production in German East Africa—Progress of Experiments.—In a voluminous article, published in "Der Pflanzer" (*6* (1910), 80), V. Lommel gives particulars regarding the production of camphor in Amani. In the first part of this article the author reports on the camphor plantations and the collection of the material; then he describes the distilling plant, mentioning the results obtained from 55 distillations of 100 kilos each, following up the account by conclusions as to the rational cultivation and manufacture. The second part is devoted to a summary and criticism of the publications on the subject which have appeared in other countries, and in a third the author draws general inference regarding the ratio of prices of natural and synthetic camphor. With regard to the prospects of the Amani camphor plantations, the author is as yet unable to express an opinion, because the following three important questions remain to be solved:

(1) How to reduce the cost of collecting the leaves and the cost of distillation to a minimum? (2) How to lay down the most rational plantations and distilling plant? (3) What will be the cost of carriage from the plantation to the still. When these questions have been settled, it will be possible to decide whether camphor cultivation in German East Africa is sufficiently remunerative to compete successfully with the expanding industry of synthetic camphor. There is no question, however, that these first attempts to produce camphor on a large scale in Amani have so far given thoroughly satisfactory results.—Schimmel's Rep., Oct., 1910, 27–29.

Amani Camphor Oil—Re-examination.—In connection with the above the following results of a re-examination of a sample of Amani camphor oil, first described and examined by Schimmel & Co. in 1906 (see Pro-

ceedings, 1907, 764), is interesting: Sp. gr. at 15° C., 0.9203; opt. rot. = + 39° 42′; refract. index, 1.47753; solution in 80 per cent. alcohol, at first clear, turning turbid with 1.5 vol.; also clear with 90 per cent. alcohol, but becoming opalescent on further dilution; deposits large quantities of camphor when cooled to a low temperature.—Ibid, p. 29.

Cinnamomum Burmanni, Blume—*Yield and Properties of Oil from the Bark.*—Two lots of cinnamon bark have been received by Schimmel & Co., the one from the island of Celebes, the other from the island of Timor, which when anatomically examined by Dr. Giessler proved to be identical, the parent-plant of both, according to this authority, being *Cinnamomum Burmanni*, Blume (*C. Kiamis* Nees). This material yielded on distillation 0.5 per cent. of brownish-yellow oil with an aroma resembling that of Ceylon cinnamon oil, but less delicate. The constants of this oil also differed from those of Ceylon cinnamon oil, being: $d_{15°}$, 1.0198; a_D—1°50′; n_D 20°, 1.58282; soluble in 0.8 vol. and more of 80 per cent. alcohol, but giving no clear solution with 10 vols. of 70 per cent. alcohol. The cinnamic aldehyde content, as determined with neutral sodium sulphite, was 77 per cent; with bisulphite it showed 80 per cent., but this is considered untrustworthy. The phenol content was approximately 11 per cent.—Schimmel's Rep., Oct., 1911, 106.

Ocotea (Mespilodaphne) Pretiosa—Volatile Oils from the Branches and from the Wood.—Roure-Bertrand Fils have received from Brazil, under the name of "Priprioca," a sample of the branches and wood of a tree which is said to be known there as "female Priprioca," and which has been identified by the botanical examination of E. G. and A. Camus as being derived from *Ocotea* (*Mespilodaphne*) *pretiosa*, Nees. The branches yielded 0.5 per cent. of a mobile volatile oil, having an odor reminding of linaloe oil, and apparently consists almost entirely of linalool. It was soluble in all proportions of 80 per cent. alcohol and in 1¼ vols. of 70 per cent. alcohol. Its sp. gr. at 15° = 0.8912; a_D + 7° 20′; $n_{D20°}$, 1.469; ester val., 13.3; ester val. after acetylation, 165.2 = 51.8 per cent. of alcohols.

The wood yielded 0.693 per cent. oil, which settled in two separate layers, one heavier, the other lighter than water. The odor of the *lighter fractions* reminded both of linaloe and of "rose wood," and in addition they had a faint subsidiary odor of cinnamic alcohol. Sp. gr. 15°, 0.9539; a_D + 8° 48′; $n_{D20°}$, 1.501. The *heavier fractions* (sp. gr. 15°, 1.0551) had an odor like linaloe oil, also reminding of cinnamon. The *total oil*, prepared by mixing the lighter and heavier fractions, was found to possess the following properties: $d_{15°}$, 0.9808; a_D + 7° 12′; $n_{D20°}$, 1.519; acid. v., 2.1; sap. v., 128.1; ester v. after acetyl., 219.8; soluble in its own vol. and more of 80 per cent. alcohol, and in 5.5 vols. and more of 70 per cent. alcohol.—Schimmel's Rep., April, 1911, 83; from Ber. von Rouer-Bertrand Fils, October, 1910, 3.

MYRISTICACEÆ.

Nutmeg-tree Bark—Yield and Properties of Volatile Oil.—The bark of the nutmeg-tree yielded on distillation at Buitenzorg, 0.14 per cent. of volatile oil, having the sp. gr. (at 26° C.) 0.871, and the opt. rot. —12° 14′ in a 10-Cm. tube.—Schimmel's Rep., April, 1911, 83; from Jaarbock van het Dept. van Landbouw in Nederlandsch-Indie, 1909, 64.

POLYGONACEÆ.

Rheum Palmatum—Identification as the Source of Medicinal Rhubarb. —Dr. C. C. Hosseur, having received from Dr. Albert Tafel, the well-known Tibetan explorer, his interesting botanical collection for examination, had the opportunity of making a thorough study of the botanical source of medicinal rhubarb as revealed by five rhubarb plants included in this remarkable collection. Beginning his work in 1909, in the Botanical Museum at Berlin, it has just been completed in the Kew-Herbarium, London, with results which justify the conclusion that the best medicinal rhubarb is derived only from *Rheum palmatum*, L., thus confirming the previously expressed view of Maximovicz, Tschirch and Wilson, that the best rhubarb comes from *R. palmatum*, and that this species is the one that should be cultivated. The view that was formerly taken, that the "southern" rhubarb from Szechuan comes from *R. officinale*, and the "northern," from Kuku-noor, from *R. palmatum*, var. *β-tanguticum*, has given way to that which regards *R. palmatum* as the true source. The error is explained by a statement of Dr. Tafel's, that the Tibetans dig the roots of other kinds of rhubarb and make a show of drying them, and profess that they obtain medicinal rhubarb from them, in order to mislead Europeans. Dr. Tafel himself collected specimens of *R. spiciforme*, with which the Tibetans tried to deceive him in this way. Another error which has got into the literature of the subject, which is now cleared up, is in regard to the use of the terms "high-dried" and "sun-dried." It has been supposed that the "high-dried" rhubarb was dried by artificial heat, but it appears that this is not so; most of the rhubarb that is gathered is peeled and dried at once, the rhizomes being strung on lines stretched from one tree to another, in the cedar woods where the best Shensi rhubarb is gathered; the trees afford but little shade, and this rhubarb is known as "sun-dried." "High-dried" rhubarb, on the other hand, is dried in a shady part of the houses, usually under the roofs; the term "high" refers to its position, and not to the temperature employed.

In the oldest literature of the subject it is stated that the drug is obtained from *one* species, which comes from Tanguten land. Some confusion has arisen through the use of the names Tangutans and Tibetans, which have been supposed to indicate different peoples; but the fact is that the whole of Eastern Tibet, from Lake Kuku-noor in the north to the Himalayas in the south, is inhabited by one people, speaking Tibetan, who call

themselves Tibetans or Tangutans indifferently, the names Tangut and Tibet both referring to the one country, like the names Cathay and China. Prof. Tschirch has received some seeds from Dr. Tafel, and these under the care of the head-gardener, Mr. Schenck, have germinated splendily, so that a reasonable hope is entertained that this plant will again be prevalent in European gardens.—Arch. d. Pharm., *249* (Aug. 26, 1911), 419–424.

Rhubarb—Constituents.—F. Tutin and H. W. B. Clewer have contributed a paper detailing the results of their researches on the constituents of rhubarb. Sun-dried Shensi rhubarb was exhausted with hot alcohol, and the concentrated extract obtained by evaporation of the alcohol was distilled in steam. The volatile constituents consisted of a small quantity of essential oil and palmitic and hexoic acids. The non-volatile portion was extracted with water, and from the resulting liquid by extraction with ether and treatment of the residue from the ethereal solution with petroleum ether and various alkalies the following substances were isolated: Cinnamic and gallic acids, rhein, a new anthraquinone derivative, $C_{17}H_{10}O_6$, m. p. 295–297° C., to which, the name rheinolic acid is given, emodin, aloe-emodin, emodin mono-methyl ether, and chrysophanic acid. The aqueous liquid yielded to amyl alcohol a crystalline mixture of glucosides of rhein, emodin, aloe-emodin, emodin mono-methyl ether, and chrysophanic acid, as well as some tannin, gallic acid, and an amorphous non-glucosidic resin; the latter, which, on hydrolysis yielded cinnamic and gallic acids, rhein, emodin, aloe-emodin, emodin mono-methyl ether, and chysophanic acid, and a new compound having the formula, $C_{14}H_{12}O_3$, m. p. 256° C., probably trihydroxy-dihydroanthracene. This resin is the principal purgative constituent of the drug. Dextrose in a crystalline state, and levulose were also obtained from the aqueous liquid. The water-insoluble portion of the non-volatile substance yielded to petroleum ether a mixture of palmitic, stearic, oleic, linolic and linolenic acids, and also a phytosterol (verosterol), $C_{27}H_{46}O$, as well as rhein, rheinolic acid, emodin, aloe-emodin, emodin mono-methyl ether, chrysophanic acid, a trace of a substance not melting at 340° C., and more of the crystalline mixture of glucosides. The presence of aloe-emodin in rhubarb has not been previously recorded. It therefore appears that the "rheoanthraglucoside" of Tschirch and Henberger was a mixture of the crystalline glucosides of the anthraquinone derivatives, and the non-glucosidic resin referred to, while "rhabarberone" and "iso-emodin" were simply impure aloe-emodin.—Pharm. Journ. and Pharmacist, April, 22, 1911, 529.

Rumex Maritima—Use of the Seeds in India, Composition, etc.—Quoting from the annual report for 1910–11 of the Industrial Section of the Indian Museum, David Hooper says that the drug called "Bijband" consists of the shining angular seeds (nuts) of species of rumex which are used as an alterative and aphrodisiac. This drug has been referred by Murray to

Polygonum aviculare, Linn., and by Atkinson to *Rumex Wallichii*, Meissn. (*R. maritima*, Linn.); some of the seeds sold in Calcutta as "Bijband," and obtained from Delhi, were sown in the Botanic Gardens, Sibpur, and proved to be *R. maritima*. As no analysis of these seeds is on record, they were examined, with the following results:

Water	10.30
Fat	2 57
Tannin	5.10
Albuminoids	10.23
Carbohydrates	61.95
Fibre	6.63
Ash	3.20

—Pharm. Journ. and Pharmacist, Sept. 9, 1911, 350.

SCROPHULARIACEÆ.

Azafran—A Root-Dye from Paraguay.—C. Liebermann has investigated the dye which can be isolated from the root of a plant belonging to the Scrophulariaceæ and indigenous to Paraguay. The dye is obtained from the roots by means of boiling alcohol or benzene, when it separates in the form of orange-red flakes which melt at 214°. It is soluble in organic solvents, insoluble in water, unaltered by alkalies and ammonia in the cold. When boiled with alkalies or alkaline carbonates it dissolves, giving a yellow solution, from which it is reprecipitated by alkalies. With concentrated sulphuric acid it gives a blue coloration, which changes to violet on the addition of alcohol. The dye, for which the author suggests the name *Asafrin*, contains no nitrogen. On analysis it is found to contain about 75 per cent. carbon and 9 per cent. hydrogen. No methoxyl or ethoxyl groups are present in it. Its molecular weight lies between 448 and 462, and it contains one hydroxyl group.—Chem. News, July 7, 1911, 11; from Ber. d. D. Chem. Ges., *43* (1911), No. 7.

Bartsia Odontites—Mannitol an Abundant Constituent.—In the course of experiments on the herb of *Bartsia Odontites*, in England a very common wayside plant of the N. O. Scrophulariaceæ, undertaken to determine a possible toxic constituent, similar in activity to digitalis, H. Finnemore and G. E. Town obtained by continuous extraction with hot alcohol, a concentrated liquid from which a fairly large amount of crystalline matter separated on standing. This on examination proved to be mannitol, which was identified both by composition and melting point, and by that of the acetyl derivative. No active constituent was revealed by the investigation. —Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 444.

Digitalis—Digitoxin Content in Different Organs of the Cultivated Plant.—A. Barentsen after briefly describing the method of cultivation of digitalis, gives the results of digitoxin determination by the Keller-Fromme

method in different organs of plants cultivated by him, as follows: Root-leaves, 0.527 and 0.531 per cent.; flowers, 0.563 and 0.585 per cent.; seeds, 0.215 and 0.229 per cent. The plants are set out in spaces about ¾ metre apart. The author will supply plants for cultivation experiments. —Pharm. Zentralh., *52* (1911), No .5, 102; from Ons Orgaan, 1910, 157.

Digitalis.—Its variability is the subject of a paper by Worth Hale, M. D., which appears in "Proceedings," 1910, 924–929.

Digitalis—Pharmacognostic Distinction of the Hairs on the Leaves.—Henry Kraemer points out the possibility of determining the age of digitalis leaves (whether first or second year's growth) and of the source of the same (whether from wild or cultivated plants), as a means of deciding upon their pharmacological efficiency, by the occurrence of certain distinctive types of hairs and their relative distribution in different specimens of the drug. These distinctions, depending on age of plant and source, are described, with illustrations showing the various forms of hairs revealed under the microscopic lens.—Amer. Journ. Pharm., August, 1911, 365–371.

Digitalis—Action of Old Powder on Hydrogen Dioxide.—E. Choay communicates the results of an investigation regarding the action of old digitalis powder on hydrogen dioxide. A quantity of fresh leaves of Alsace digitalis was divided into three lots and dried: (1) *in vacuo* in the cold; (2) in the air; (3) in an oven at 40° C. The dried leaves, powdered, were placed in desiccators. After five months, the powder from (1) was still quite green, and possessed the odor of the fresh leaves. The powders were then tested to see if they still retained the property of decomposing hydrogen dioxide, and if so, if they had different degrees of catalytic activity. For the purpose of comparison, 1 Gm. of each powder was macerated for two hours at 15° C. in 40 Cc. of distilled water, when there was added 10 Cc. of 12-volume, neutral, hydrogen dioxide; after an hour's contact, the titer was taken in each case on 5 Cc. of the filtered liquid, with a solution of permanganate (3.14 Gm. $KMnO_4$ per liter). A parallel series of tests was made of macerations of 1 Gm. of the powder and 40 Cc. of water, but, before the addition of the hydrogen dioxide, the liquids were boiled for ten minutes and the original weight made up after cooling, and then titrated with the permanganate under the same conditions. A control mixture made with 40 Cc. of water and 10 Cc. of the hydrogen dioxide, showed that 5 Cc. required 21 Cc. of the permanganate solution. The results obtained were as follows: Powder (1), maceration not boiled, required 9.9 Cc. of permanganate; boiled maceration, 22.1 Cc. of permanganate. Powder (2), respectively, 13.3 Cc. and 23.2 Cc. Powder (3), respectively, 20.5 Cc. and 22.2 Cc. The author concludes that the method of drying the leaves has a considerable influence on the catalytic activity. Indeed, after five months' preparation this activity is about

twenty times greater for the leaves dried *in vacuo* in the cold than for those dried in an oven; those dried in the air appear to have an intermediate activity.—Pharm. Journ. and Pharmacist, May 13, 1911, 621; from Journ. de Pharm. et Chim., 1911, *3*, 343.

Digitalis—Manganese a Constituent of the Leaves.—J. Buzmann finds that digitalis leaves contain a marked quantity of manganese. When the powdered leaves are incinerated the ash obtained is tinted bluish or greenish by the alkali manganates formed. On slightly acidifying these with dilute nitric acid the characteristic violet of permanganates is evident. It would seem that *Digitalis purpurea* can select manganese salts from a soil which contains only small quantities. The ferruginous sandstone of the Vosges contains but 0.43 per cent. of manganese and 4.82 per cent. of iron. Yet the leaves of foxglove grown thereon give 5.8 per cent. of ash, no less than 9.02 per cent. of which is manganese and only 0.8 per cent. iron. The ash of the leaves of the nearly allied *Digitalis lutea* and *D. ambigua* contains no manganese.—Schweiz. Wschr. f. Chem. u. Pharm., xlix (1911), No. 40, 562.

Digitalis Leaves—New Researches on Glucosides.—In a preliminary article giving the results of his researches on the glucosides of digitalis leaves, Dr. F. Kraft observes that among the digitalis glucosides described by Schmiedeberg in 1875 (see "Proceedings," 1875, 444–447), *digitalein* was regarded as the most important, since it combined activity with water-solubility, and would therefore be a constituent of a properly prepared infusion of the drug. Nevertheless, neither Schmiedeberg nor later Kiliani, succeeded in preparing a chemically pure body to which the specific name "digitalein" could be applied with the assurance of uniformity in composition, activity and chemical properties, and the same holds true of the so-called "digalen" described by Cloëtta (see "Proceedings," 1905, 532), which must also be considered a more or less impure form of "digitalein." But by avoiding all reagents and operations that are liable to cause its decomposition, Dr. Kraft has for several years past succeeded in preparing "digitalein" in a pure, water-soluble form, which he now describes and proposes to distinguish by naming it

Gitalin.—This, as obtained by a very simple process, described in some detail by the author, is a white amorphous powder, permanent in the air, neutral in reaction, and melting at 150°–155°. It is soluble in 600 parts of cold water and in all proportions in chloroform without undergoing change; soluble also in the other organic solvents, with exception of petroleum ether and carbondisulphide; but in these solutions, even in that of ether, it quickly undergoes change, forming a water-insoluble modification. It is obtainable also in a crystallized form, as

Gitalinhydrate; but this shows considerable variation from the original amorphous product, and melts at 75° C. It is sparingly soluble in water

(3000 parts) and in alcohol; but under proper treatment can be dehydrated and restored to its original condition.—Schw. Wschr. f. Chem. u. Pharm., xlix (1911), Nos. 12 and 13, 161 and 173.

Digitalis Leaves—New Glucoside Resembling Kiliani's Digitonin.—In the course of his researches on the digitalis glucoside referred to in the preceding abstract, Dr. Kraft isolated a new glucoside from the leaves possessing certain properties which led him to infer its probable identity with the *digitonin* isolated by Kiliani from the seeds. While differing from this glucoside in some of its characters, the new glucoside possessed identical properties in others which are regarded as particularly important, such as inactivity, formation of a hydrate, failure to give a color reaction with sulphuric acid containing iron, etc. The author, after consultation with Kiliani and a joint comparison of the two substances, has now found, however, that the new glucoside is doubtless a distinct body, which he promises to subject to further and more comprehensive examination. The statement of Kiliani that *digitonin is present only in digitalis seed* is therefore not controverted.—Ibid., No. 17, 236–237.

Digitalis Leaves—Proper Time for Collection.—The different pharmacopœias demand that digitalis leaves shall be collected from the flowering plant, consequently during the second year of its growth, some of them specifying "in the beginning," others "before the end" of the flowering period. In the opinion of Caesar and Loretz, however, the assumption of the inferior activity of the leaves collected from plants during the first year's growth is not tenable. In their experience it is not so much a question whether the leaves are collected from flowering plants or before flowering, but exclusively one of the state of development of the plants themselves. The leaves of the flowering two-year-old plant should as a rule not be collected before July, but they have demonstrated that leaves of one-year-old plants collected after the beginning of August possess an activity in no respect inferior to that of the leaves of flowering two-year-old plants, and the experience during the current year (1910) has again confirmed this, as well as the fact that, aside of the state of development, the weather and locality of growth exert a decided influence on the activity of the drug.

It has been proposed by Perrot and Goris to sterilize the freshly collected leaves by exposure to steam for 5 to 10 minutes in order to destroy the enzymes which Kobert regards as being responsible for the deterioration of digitalis leaves. Caesar and Loretz have heretofore always resorted to rapidly and completely drying the leaves, with uniform satisfaction, and comprehensive experiments made by them confirm their confidence in the efficiency of this method to destroy the enzymes, while the results obtained with the method of steaming the leaves were directly in the negative.—Pharm. Ztg., lv (1910), No. 78, 789; Caesar & Loretz' Jahresber.

Digitalis—Method of Producing a Stable Preparation.—Under a Ger-

man patent a stable and active preparation is obtained from fresh digitalis leaves as follows: 10 kgm. of the finely-powdered leaves are extracted several times with 5 parts of strong alcohol, the extractions are neutralized with alcoholic soda solution and, after concentration in vacuo, mixed with 5–10 parts of ether until a precipitate is no longer produced. The precipitate, consisting of the undesirable components of the drug, is then removed, and the liquid concentrated in a vacuum, 2 parts of milk sugar being added and the product reduced to powder. A grey-green powder results, which may be diluted by the addition of more milk sugar to a definite standard of activity.—Pharm. Ztg. lv (1910), No. 102, 1029.

Digitalis—Valuation of Activity.—A. Rising, after a review of the different glucosides isolated from digitalis leaves and the individual physiological methods employed for the valuation of their activity, concludes that the isolated "digitoxin" represents only about 10 per cent. of the original activity of the drug. The problem is therefore presented of the possibility of including the remaining 90 per cent. of active principles in a preparation of digitalis, and in this he has been in a measure successful. By a method, the details of which are however not given, he has obtained a digitalis preparation of very high activity.—Pharm. Ztg. lvi (1910), No. 4, 36; from Svensk. Farmaceutist. Tidskrift, 1910, No. 21.

Digitalis Leaves—Importance of Physiological Valuation.—Dr. A. Joanin contributes a lengthy treatise on digitalis leaves, in which he points out that the therapeutic activity of the drug is not exclusively due to digitalin and digitoxin and the chemical valuation therefore insufficient. He maintains that the total activity of the drug can only be determined by physiological methods and recommends for this purpose the method proposed by Focke (which see in a following abstract). According to his own experiments the activity of the dried and powdered drug is not constant, the variation being mainly attributable to incomplete drying and faulty preservation. A product that will retain its activity unimpaired for a long time is obtained if the drying is conducted so that the drug retains not more than 2 per cent. of water, if it is then at once powdered, and carefully preserved from atmospheric moisture.—Pharm. Ztg., lvi (1911), No. 13, 128; from Bull. d. Sc. Pharm., 1910, No. 12.

Digitalis—Physiological Valuation.—W. Straub expresses the opinion that the physiological valuations of drugs must be accepted so long as they yield more reliable results than the chemical methods of standardization, or that they give results where the chemical methods do not, and he asserts cases exist among official medicaments. He emphatically pronounces against the resistance to physiological standardization manifested by pharmacists, and is convinced that in time not very distant physiological methods will be so perfected, that their official application will have passed the experimental stage. Meanwhile he recommends that *Fol.*

Digitalis be standardized only by physiological methods.—Pharm. Ztg., lv (1910), No. 84, 848; from D. Med. Wschr., 1910, No. 37.

Digitalis—Questionable Exactness of Physiological Standardization.—Discussing the methods proposed for the physiological valuation of digitalis, Dr. J. Burmann arrives at the conclusion that exact results are not obtainable. The method is capable of determining the toxic value of the drug or preparation, but this does not establish its pharmacological activity which is not solely dependent on the toxic constituent. Moreover, the individual resistance of frogs to the action of digitalis is variable, and often dependent on the habitat of the animal, frogs from Russia, Germany, France, etc., exhibiting great variation in this respect. The author is therefore of the opinion that valuation of digitalis by chemical methods is preferable to that depending on the physiological action, the latter being serviceable only in so far as it enables the estimations of blood pressure or the registration and observation of the heart's action.—Schw. Wschr. f. Chem u. Pharm., (1910), No. 27.

Digitalis—Standardization.—Dr. Charles C. Haskell critically revises the methods now commonly advocated for the biological standardization of digitalis, which may be divided into those carried out upon frogs (A. Houghton's 12-hour method; B. Focke's method; C. the one-hour method) and those upon mammals (A. Guinea-pig method; B. Hatcher's cat method). From a summary of the statements of the authors of these several methods, we learn that:

I. Frogs vary markedly in resistance to digitalis poisoning.

II. That the adoption of a standard is unsafe because of the uncertainty regarding the strength of this standard.

III. That guinea-pigs react with much uniformity to digitalis.

IV. That absorption plays an important part in the frog methods.

V. That guinea-pig and frog methods are lethal-dose methods; death in both cases resulting from the action of the drug on the heart.

Summing up his own inquiry, Dr. Haskell says that the final test of any method of drug assay must rest with the clinician. So far as he can learn, no such clinical trial has been made of the guinea-pig method; while Pratt in this country and Focke in Germany, have shown conclusively that the therapeutic value of digitalis leaves runs parallel with the potency of the "frog heart" methods; and that in conclusion we may say:

(1) That the variations in the reaction of frogs can be nullified by the use of ouabain as a standard.

(2) That it has certainly not been proved that guinea-pigs possess any marked advantage over frogs as experimental animals for testing digitalis.

(3) That lethal-dose methods are unsafe, while the one-hour frog heart method is both a good qualitative and quantitative test for the heart tonics. —Amer. Jour. Pharm., May, 1911, 201—211.

Digitalis—Experiments with the Cat-method for Testing.—In view of the large amount of work which is being carried out just now with the four American methods in use for the physiological testing of the digitalis series, namely: the twelve-hour frog method, the one-hour frog method, the guinea pig method and the cat method, C. R. Eccles has undertaken an extensive series of experiments with one of these methods, selecting the cat method of Hatcher and Brody, with the immediate purpose to ascertain with what ease the method could be used, and what uniformity of results could be obtained. Considering the result of this work, which is described in great detail, and his experience with the other three methods, Mr. Eccles is led to the conclusion that: (1) The cat method of Hatcher and Brody is unquestionably the most complicated and difficult of all the American methods, requiring an operator of considerable experience in animal experimentation. (2) It is *not* a method that will be found convenient and generally serviceable by the retail pharmacist. (3) It is more time-consuming than the other methods, requiring constant attention when started. (4) The item of expense, like that of the guinea pig method, is decidely in its disfavor. (5) The procuring of a sufficient number of suitable animals is a practical impossibility for the manufacturing pharmacist having a large number of preparations to test. (6) Lactating animals cannot be depended upon as they seem to possess a greater tolerance for the drug, the degree depending on the stage of lactation. (7) While individual results will not infrequently check each other very closely, considering the results of an entire assay, great variations are often observed, amounting in some cases to more than 100 per cent. (8) When testing a preparation one has to consider six or more unknown factors, namely:

a. Toxicity of ouabain. *b*. Power of ouabain to exactly replace the digitalis bodies. *c*. Amount of digitalis to be injected. *d*. Amount of ouabain to be injected. *e*. Rate of injection. *f*. Time.

(9) This method has perhaps one point of superiority over all others in that the matter of absorption is entirely eliminated.—Amer. Journ. Pharm., Oct. 1911, 478–491.

Digitalis and Strophanthus—Method of Conducting the Physiological Valuation of Their Preparations.—In an exhaustive paper on the value of the physiological standardization of digitalis and strophanthus preparations, Dr. C. Focke concisely describes the method of conducting the process. He employs for this purpose frogs exclusively, selecting them of a weight ranging from 18 to 35 Gm. The operation is quite simple: The heart of the frog is exposed, the preparation to be tested is injected into the thigh of the animal, and the time required to still the heart's action is noted—the animal is then slaughtered. The factors for comparison are then obtained by registering: p, the weight of the animal in grammes; d, the volume of the injected fluid, in cubic centimeters; t, the time required

to still the heart's action, in minutes. From the data so obtained the calculation is then made as follows: $V = \frac{p}{d \times t}$ —the result being compared with a test preparation (in the case of digitalis), V having established the normal value of 4.5.

The preparation of digitalis (resp. strophanthus) must be brought into a condition suitable for making the test, and these conditions are exhaustively described by the author. Digitalis is to be used in form of a 10 per cent. unfiltered infusion, or in solutions deprived as much as possible of alcohol and the volume restored with water; strophanthus, if in form of tincture, is diluted with 19 times the volume of water; while preparations of either, containing glycerin, are unsuitable. The author is decidedly of the opinion that frogs subjected to this test suffer no pain whatever, and that the charge of inhumanity therefore is not justified.—Arch. d. Pharm. *248*, (1910), No. 5, 345.

Leptandra—Yield and Character of Volatile Oil.—By extraction of 55.56 kilos of leptandra (the dried rhizome and roots of *Veronica virginica, L.*), Power and Rogerson obtained 19.79 kilos of alcoholic extract, of which 2 kilos were subjected to steam distillation. The yield of volatile oil amounted to 0.9 Gm. (=0.016 per cent. calculated in the dried drug). This oil was a dark brown, mobile liquid, boiling between 120° and 160° 25 mm.), and had a strong, penetrating odor. It gave no color reaction with ferric chloride.—Schimmel's Rep., April, 1911, 80; from Journ. Chem. Soc. *97* (1910), 1945.

SOLANACEÆ.

Atropa Belladonna—Influence of Nutritive Elements on Growth and Alkaloid Content.—S. Vreven and C. Schreiber observe that wild belladonna is generally more active than the cultivated plant, and conjecture that this may usually be attributed to the influence of nutritive elements of the soil upon which it grows. The wild plants grow on ground chosen by themselves as best adapted to their vitality; the cultivated plants grow on soil chosen for them, which may not contain the necessary constituents favorable to the normal formation of alkaloidal bases. The small proportion of alkaloid so often found in the cultivated plants may be attributable either to deficiency or excess of the necessary food, or to a want of equilibrium among the nutritive elements, *i. e.*, nitrogen, phosphoric acid, and potash. Experiments have been made with soil deprived of the nutritive elements, and adding to it suitable manure. The results are summarized thus: Belladonna is shown to be very susceptible to the action of phosphoric acid, nitrogen, and especially potash. The want of these elements is seen in a distinct lowering of the yield. Plants cultivated in pots containing no added manure perish rapidly. The depression in the yield is much more pronounced in the roots than in the other organs of the plant.

The time of flowering is retarded by absence of nitrogen and phosphorus, but not by that of potash. Plants deprived of the three elements referred to present a characteristic coloration; without nitrogen, they are chlorotic; without phosphorus, there is a violet tint, particularly of the veins; without potash, the plants are flabby. As to the alkaloidal content, the leaves of plants, grown on soil poor in nitrogen or phosphorus, contain little alkaloid, while in the case of plants cultivated in the absence of potassium salts, the leaves are rich in alkaloid. The experiments were made with a fertilizer having the following composition: Ammonium nitrate, 10 Gms.; disodium phosphate, 12 Gms.; potassium carbonate, 5 Gms.; calcium carbonate, 4 Gms.; magnesium carbonate, 4 Gms. The results obtained by omitting one or other of the ingredients are as indicated above. The cultures were made on a muddy earth of average consistence (l'alluvion de la Herck), to 22 kilograms of which the above quantity of nutritive mixture was added.—Pharm. Journ. and Pharmacist, June 24, 1911, 843; from Ann. de Pharm., Mar., 1911, 97.

Belladonna—Cultivation in California.—The "Pacific Pharmacist" mentions that owing to a rather chilly season the harvesting of the first crop (1911) of belladonna was somewhat delayed, second crop (September) being in process of drying, and that there will be a light third crop The yield per acre of dry material will be about three-fourths of a ton. All the belladonna grown on the farm in Castro Valley, near Oakland, is shipped to a large eastern manufacturing firm, who report it of very high quality.—Pacific Pharm., Sept., 1911, 157.

Belladonna—Insect Pest Destroying the Leaves.—P. É. F. Perrédès describes an insect attacking the leaves of belladonna plants on the farm of Messrs. Ransom and Son in the vicinity of Hitchin, Hertfordshire, during the last few years, being especially prevalent in dry seasons, when it causes considerable damage to the plants. This insect was identified by the Board of Agriculture and Fisheries in May, 1910, as

Epitrix atropæ, Fondras, a small beetle belonging to the tribe *Halticae* (flea-beetle), of the series *Phytophaga*, or plant-devourers, and is shown in a plate illustration exhibiting the insect, natural size, in dorsal view, and dissected to show dorsal views of head, thorax, right fore leg, wing-case, wing and hind leg. The paper is also accompanied by plate illustrations showing the ravages on a belladonna leaf attacked when young, on a more fully developed leaf, on a young plant, and on a plant which had largely outgrown the attacks of the insect. The author suggests and describes for the eradication of this insect the same remedies and treatment as are applied for the eradication of the closely-related "turnip-fly."—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1910, 410–417.

Belladonna—Adulteration of the Leaves with the Cut Stems of the

Plant.—Charles E. Vanderkleed draws attention to a new form of belladonna adulteration consisting of the addition of cut stems of the plant to the leaves. The stems were heavy, almost woody in texture, and were uniformly about 1½ inches in length, and they composed about 27 per cent. of a representative sample of thirteen bales which were promptly returned to the London exporters. It occurred to Mr. Vanderkleed, the stems having been verified as being those of *Atropa Belladonna*, to determine their alkaloidal content, and he was surprised to find them to contain 0.175 per cent. of mydriatic alkaloids, which is the more surprising owing to the belief of many that the stems of belladonna are devoid of alkaloid. The adulterated leaves had shown a percentage of 0.265 per cent., while the leaf portion assayed 0.298 per cent. of mydriatic alkaloids.—Merck's Rep., Nov., 1911, 304.

Belladonna Leaves—Adulteration with Ailanthus Leaves.—Dr. W. Mitlacher has found on the Austrian market a parcel of belladonna leaves which, similarly to the adulterated senna leaves previously described by him (see under "Leguminosæ") contained *ailanthus* leaves as adulterant. These, in their dry, crumpled condition had the general appearance of the belladonna leaves, but on soaking them in water they were very readily identified by their ovoid shape, and the entire and glandularly crenate margin. The identity of the adulterant was completely confirmed by the microscopic examination.—Pharm. Ztg., lvi (1911), No. 48, 486; from Zschr. d. Allgem. Oesterr. Apoth.-V., 1911, No. 19.

Capsicum—Detection in Ginger Preparation by the Extreme Pungency of Capsaicin.—E. N. Nelson, discussing particularly the availability of the pungent principle, capsaicin, for the detection of capsicum in ginger preparations, points out that capsaicin gives no characteristic micro-chemical reactions which could be utilized, and that the test which depends on the development of a characteristic vanilla-like odor when a mixture of capsaicin (in alcoholic solution) platinic chloride and hydrochloric acid is evaporated spontaneously, is not sufficiently delicate. The detection of small amounts of capsicum in ginger preparation appears therefore to be restricted to the physiological action of the capsaicin. Such a method has been described by Garnett and Grier, but is defective because of the incomplete destruction of the pungent principle of ginger—gingerol. The author now proposes a method which, based upon that just mentioned, differs from it in important particulars, and is described as follows:

Ten Cc. of a tincture, or the ether extract from 100 Cc. of a beverage (from which any alcohol present has been evaporated previous to extraction with ether) are treated in a porcelain dish with 10 Cc. double-normal alcoholic potassium hydroxide and evaporated on the steam-bath. About one-tenth grain powdered manganese dioxide is added, 5 to 10 Cc. water, and the heating on the bath continued for about twenty minutes, or until

volatile oils are expelled. Cool, acidify with dilute sulphuric acid, and extract at once with petroleum ether. Evaporate the petroleum ether in a small crucible, keeping the residue within as small an area as possible, and heating on the steam-bath for about five minutes. The residue will be very small and in some cases scarcely visible, and it will contain all the capsaicin from capsicum, mixed with a minimum amount of extractive matter. Apply the tongue to the residue, being careful to keep the material on the tip of the tongue. If capsicum is present the characteristic burning sensation will soon be felt.—Chem. News, March 10, 1911, 111-112; from Journ. Industr. and Eng. Chem., ii (1910), No. 10.

Duboisia Hopwoodii, F. V. M.—Histological Examination.—O. A. Farwell contributes an interesting histological study of the pitury plant, *Duboisia Hopwoodii*, F. v. M., an Australian shrub, which when growing in dense forests attains the size of a tree 60 feet in height. The entire plant is glabrous; the leaves (which are shown in natural size in a drawing of a twig of pituri) are narrowly lanceolate or linear, rather thick, entire, acute, narrowed into a short petiole a half inch or less in length, and are from two to four inches long. The flowers are short, terminal cymes, or leafy, pyramidal panicles; the corolla is a half inch or less in length, with broad, obtuse lobes shorter than the tube. All parts of the plant, which is known by various local names, such as "Pituri," "Pitchery," "Bedgery," and "Pedgery," produce an alkaloid, *piturine* ($C_{12}H_{14}N_2$), which is said to be similar if not identical with nicotine. The histological elements of the drug are described and shown in photomicrographic illustrations accompanying the paper.—Merck's Rep., May, 1911, 121–123.

Scopolia Carniolica—Medicinal Value.—At the meeting of German Naturalists and Physicians, Dr. Abromeit spoke interestingly of the medicinal value of *Scopolia carniolica*, which he regards sufficiently useful to be admitted into general practice, the more particularly since its alkaloidal constituent, scopolamine, has been therapeutically proven quite efficient. He states that the plant is cultivated to a limited extent in some localities, and recommends that its cultivation be carried on more extensively.—Pharm. Ztg., lv (1910), No. 80, 803.

Solanum Dulcamara—Quantitative Examination of the Berries.—Benton R. Anderson reports the details and results of a quantitative proximate examination of the fruit of *Solanum dulcamara*, gathered at Sylvan Beach, New York, during the month of August. The average weight of a berry was 0.125 Gm. They are quite sweet, and yielded to hot alcohol by 30 days' continuous extraction, followed by boiling water, 31.55 per cent. of sugar—evidently fructose. By extraction with ethyl ether under a reflux condenser, the dried residue remaining after the extraction with alcohol and water yield an oil, amounting when purified to 9.1569 per cent. of the fruit employed. This oil had a beautiful amber color, was

quite viscous, and had the sp. gr. 0.9603. Proteins were present in small amounts, corresponding to 0.934 per cent. according to the nitrogen estimation. The acids, present in small amounts, were tartaric and citric, together with some acetic acid, probably due to fermentation. An alkaloid, apparently *Solanin*, was found to the amount of 0.15 per cent.; the ash amounted to about 5 per cent.—Chem. News, July 7, 1911, 2–3.

Tobacco—Cultural Experiments for Nicotine as a Crop.—Th. Schloesing says that in view of the high price of nicotine, and its extending application as an agricultural insecticide, careful experiments have been conducted in France, to determine whether tobacco could be made a remunerative crop when grown solely for the production of the alkaloid. It is found, however, that, at present prices, the cost of production and yield of nicotine from this source does not allow it to compete with that obtained from by-products of the tobacco industries, which, as is well known, is the present source of commercial nicotine. In the course of these experiments, the very complete results of which are tabulated, it is shown that the maximum yield of nicotine was, as an average, obtained from plants developed to carrying six leaves; it gradually fell with plants bearing twelve to eighteen leaves, and showed a very material diminution in fully developed plants. The highest recorded yield was 156.7 kilos of nicotine per hectare; and the highest percentage of nicotine found in any parcel of leaves was 10.5 per cent. These were in plants of six leaves. The highest mean yield of all experiments was 149.5 kilos of nicotine per hectare, and the lowest 10.2 kilos. The lowest figure recorded for nicotine in any parcel of leaves examined was 0.22 per cent. in the dried material from a fully developed plant.—Pharm. Journ. and Pharmacist, Sept. 10, 1910, 343; from Compt. rend *151* (1910), 23.

German Tobacco—Distribution of Nicotine in the Plant.—Dr. R. Gage reports the results of a long series of experiments undertaken with the object of ascertaining the distribution of nicotine in different parts of the tobacco plant, his experiments being confined principally to tobacco grown in Germany. His results show that the nicotine content of German tobacco does not alone vary considerably in individual plants of the same species—ranging from 0.56 to 0.1 per cent., but that it varies in the individual leaves of the same plant, as well as in the axils—the content of alkaloid at the axil-points being appreciably smaller than in the other parts of the axil. The experiments were carried out in each case with nine plants of each species, planted in June and harvested in August, which were raised from seeds reliably obtained from seven different localities—Apoth. Ztg. xxvi (1911), No. 90, 938.

OLEACEÆ.

Ash Seeds—Properties of the Fixed Oil.—An investigation of the fixed

oil, extracted by W. Bach from the seeds of the ash (*Fraxinus*) in a yield of 9.7 per cent., shows this oil to have the following characters and constants: It was brownish-yellow, moderately viscous, and had an odor resembling that of tea. It possessed the following constants: Specific gravity, 0.9181; saponification value, 168.5; iodine value, 129.5; Reichert-Meissl value, 1.68; the unsaponifiable portion amounted to 5.5 per cent. and consisted of phytosterol. The freshly prepared oil contained 1.71 per cent. of free acid, reckoned as oleic. The fatty acids obtained by saponification of the oil melted at 36.8° C. and solidified at 28.6° C., and had an iodine value of 125.8 and saponification value 181.7. The oil appeared to resemble the oils of soya beans and of sunflower seeds, and to possess feeble drying properties, an exposed thin film not being hard after fourteen days.—Pharm. Journ. and Pharmacist, June 24, 1911, 843; from Chem. Ztg., May 4, 1911, 478.

Olive Oil—Method of Bleaching Practiced in Italy.—According to a French consular report, consumers of olive oil are coming more and more to give preference to an oil of pale amber color in place of the natural golden yellow or greenish, and the producers of the oil are accordingly driven to removing the color of the oil by artificial means. Citric and tannic acids are both employed for this purpose, especially the latter. If much color is to be removed, about 5 per cent. of tannic acid is used; for medium-colored oil 3 per cent. suffices, and for paler oils from 1 to 2 per cent. The tannic acid is dissolved in water and the solution added to the oil and mixed for fifteen minutes; after half an hour the mixture is poured into another vessel, and some hours later it is poured back into the first and allowed to stand for three days, when the oil is drawn off. Some oils can be sufficiently decolorized by water alone, the oil being broken up into small drops and allowed to fall into water from a height of several meters. This method is most successful if worked in the open air in bright, sunny weather.—Schw. Wschr. f. Chem. u. Pharm., xlix (1911), No. 34, 476.

Olive Oil—Adulteration with Mineral Oil.—According to A. Cutolo, mineral oil tinted with methylazodimethylaniline is used (in Italy) as an adulterant of olive oil. The mineral oil was detected by shaking the original sample with an equal volume of strong sulphuric acid, and then centrifugating. The coloring matter was removed by shaking out with hydrochloric acid, the acid liquid being red-colored. This was made alkaline with ammonia and shaken out with ether; this removed the coloring matter, which was then identified in the residue in the usual manner. The adulterated oil had a saponification value about 148; iodine value, 60.8; and the refraction figure, 64.5.—Pharm. Journ. and Pharmacist, March 11, 1911, 333; from Giorn. Farm. Chim., *59* (1910), 530, through Chem. Zentralh., 1911, 415.

LABIATÆ.

Medicinal Labiates—Mediterranean Species.—H. Delphy communicates the results of her investigation of a large number of medicinal Labiates, most of them growing in the countries bordering on the Mediterranean, among which are the following:—*Rosmarinus officinalis*, L.; *Origanum majorana*, L.; *Marrubium vulgare*, L.: *Hyssopus offic.*, L.; *Lavandula vera*, *D. C.*; *Monarda didyma*, L.; *Ocinum basilicum*, L.; *Satureja hortensis*, L.; *Mentha-species*; *Thymus vulgare*, L.; *Salvia offic.*, L.; *Salvia sclarea*, L.; *Salvia hormium*, Mönch.; *Melissa offic.*, L.; Pharm. Ztg., lv (1910), No. 78, 789; from Ztschr. Allgem. österr. Apoth.-Ver., 1910, Nos. 21–35.

Eremostachys Laciniata—Stachyose a Constituent of the Root.—J. Khouri, by the biological method of Bourquelot applied to the fresh roots of *Eremostachys laciniata* has shown the presence of a hydrolysable substance which has been isolated and proved to be stachyose, or manneotetrose. The author has previously found a glucoside in the herbaceous portions of the same plant.—Pharm. Journ. and Pharmacist, Sept. 24, 1910, 391: from Journ. de Pharm. et. Chim., 1910, *2*, 211.

Lavender—Cultivation in England.—Schimmel & Co. quote an article on lavender-growing which recently appeared in "*The Times*," London, thus making some very interesting information on this subject available for permanent consultation. From this it appears that while lavender is chiefly grown on chalk soil, long believed to be essential for its successful culture, it was shown a few years ago that plants flourished on the sandy seaside heaths of Bournemouth, and at present lavender is grown on a large scale in that district. While much of the information is particularly useful to persons contemplating its cultivation in England, much applies to other localities as well and will be profitably consulted by those interested in lavender culture.—Schimmel's Rep., Oct. 1910, 75.

Ocimum—Cultivated Species and Varieties and their Volatile Oils.—E. G. Camus and A. Camus have carried out a botanical study of the cultivated species of *Ocimum* and particularly of the varieties of *Ocimum Basilicum*, L., of which there are several, and have prepared and examined the oils obtained from them. The variety *purpurascens*, Benth. (*Ocimum medium*, Mill.; *O. nigrum*, Thouin), which is regarded by several authors as a distinct species, is cultivated under the name of violet-red basil. The var. *thyrsiflorum* Benth. (*Ocimum thyrsiflorum* Jacq.) is known as the common white basil. The var. *album*, Benth. (*Ocimum album*, L.; *O. laxum*, Vahl.; *O. Americanum*, Jacq. non L.) is cultivated under the name of lettuce-leaf basil, while the var. *crispum*, E. G. Gam. (*Ocimum crispum*, Thunb.?) is grown under the name of curly-leaved basil. The authors treat in detail of the morphological and anatomical conditions of the various degenerate species and in conclusion describe the different essential oils, of which the properties are summarized in the table below. The

variety most suitable for cultivation is *O. crispum* (curly-leaved basil) because it yields the highest percentage of oil, while so far as its odor is concerned the essential oil from this variety is in no wise inferior to the ordinary commercial product.

The oil from the lettuce-leaved basil (var. *album*) gives a slightly cloudy solution with 70 per cent. alcohol, all the other oils make clear solutions when mixed with from 2 to 3 times their volume and more of 70 per cent. alcohol. The methylchavicol (estragol) content of all the oils (ascertained by the determination of the methoxyl-group) was about 55 per cent.

Constants.	Ocimum Basilicum.					
	Var. thyrsiflorum.		Var. crispum.	Var. album.	Var. purpurascens.	
	Crop 1910.	1909.	1910.	1910.	1910.	1909.
$d_{15°}$	0.9168	0.9125	0.9123	0.8975	0.8959	0.9100
α_D	−10°52′	−11°28′	−10°30′	−12°54′	−13°52′	−10°14′
α_D of the acetylated oil	+1°36′	+1°34′	+0°30′	+0°2′	+1°52′	+3°28′
$n_{20°}$	1.488	1.484	1.484	1.479	1.477	1.477
Acid value	2.8	1.4	2.1	0.7	3.5	2.1
Ester value	5.6	3.5	4.9	7.0	9.8	7.7
Ester-content calc. as linalyl acet.	1.96 %	1.22 %	1.71 %	2.45 %	3.43 %	2.68 %
Ester v. after acet.	116.9	114.8	116.9	130.2	126.7	117.6
Alcohol content calc. as linalool	35.19 %	34.50 %	35.19 %	39.66 %	38.46 %	35.43 %
Yield	0.0855 %	—	0.1285 %	0.0780 %	0.0370 %	—

—Schimmel's Rep., April, 1911, 22–23; from Rep. of Roure-Bertrand Fils., Oct. 1910, 23.

Peppermint—Doubtful Advantage of Its Cultivation in Damp and Shady Situations.—H. John Henderson observes that the idea of growing peppermint in the shade had its origin in a statement in Sawyer's "Odorographia," to the effect that Mr. Burnett in 1816 first distilled peppermint oil in Wayne County from plants which he found and gathered on the banks of a little stream. The yield of oil was such that either the peppermint must have been growing very freely by the banks of the stream, or the plants must have contained an unusual percentage of oil. The author holds the opinion that yield of oil per acre is the only factor worthy of consideration in a commercial aspect, the percentage of oil yielded by the plants having an academic interest only. Schimmel found the fresh herb to yield 0.3 per cent. and the dry 1.25 per cent., while W. Ransom & Son have found the fresh herb to yield from about 0.2 per cent. to 0.4 per

cent. The experiment was tried of growing peppermint on the banks of a stream which bound the herb-garden of W. Ransom & Son at Hitchin. Care was taken to employ healthy stock, and Mr. Holmes's opinion was obtained as to the plant being of the proper species. The plants grew and flourished exceedingly, and on distillation on September 2, 1909, before flowering, the yield of oil was found to be 0.1 per cent. from the fresh herb. The odor was good. The yield of oil from ordinary plants cut when in flower, grown on the farm, was 0.409 per cent. The experiment shows that the yield of oil is not increased by growing peppermint in damp and shady situations. In a table appended to the paper the yield and contents are given of the oils obtained: (1) from plants grown on river bank and distilled before flowering; (2) from plants in flower grown on a heavy loam with chalky subsoil, in 1909; and (3) from mixed plants in flower grown on a deep sandy loam, in 1910—the latter yielding 0.19 per cent. of oil. For comparison, the contents of the oils distilled by the Ransoms in the years 1907 to 1910, inclusive, are also included in the tabulated exhibit.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 427–431.

Japanese Peppermint—Identity of Oil from Plants Cultivated in Germany with That Distilled from the Parent Plants in Japan.—With slips of Japanese peppermint plants received from a grower in Yamagataken, Japan, which arrived in a partly damaged (rotted) condition, Professor Thoms succeeded in raising some well-developed plants in the botanical garden of the Pharmaceutical Institute of Dahlem during the spring and summer of 1909, from which it was possible to distill the oil, when it was found that the oil produced at Dahlem was in every respect identical with a sample of oil distilled from the parent plants in Japan, received with the slips from the Japanese grower. These plants were identified by Briquet, of Geneva, as *Mentha canadensis* var. *piperascens*. Last summer (1910) the distillation experiments were repeated with a larger quantity of material (in July and August), and these fully confirmed the identity of the oils, as is evident from the following exhibit:

	Japanese Oil.	Dahlem Oil. (first and second crop.)
Spec. gravity	$d_{21°}$ 0.8998	$d_{23°}$ 0.8976
$a_{D21°}$	−36.75°	−31.85°
Acid value	4.42	2.28
Ester value	22.4	16.2
Ester v. after acet.	263.5	264 to 265
Cong. pt.	+10 to +10.5°	+8°
Ester-menthol	6.23 %	4.5 %
Total menthol	73 %	73.4 to 73.7 %
Free menthol	66.7 %	68.9 to 69 %

Contrary to expectation, the second crop being distilled just before the

flowering period (August) yielded only 0.076 per cent (=0.455 per cent. dry) as against 0.087 to 0.091 per cent. (=0.524 to 0.535 per cent. calculated for the dried herb) from the first crop gathered in July, 1910.—Schimmel's Rep., April, 1911, 92–93; from Ber. d. Deutsch. Pharm. Ges., *20* (1910), 424.

Japanese Peppermint—Cultivation in German S. W. Africa.—During the present summer (1911) Professor Thoms has again distilled peppermint oil from the Japanese plant cultivated at Dahlem, the yield being 0.893 per cent., calculated for the dry herb. Cuttings of the Japanese plants have also been supplied to South Germany, German East Africa and German S. W. Africa. The last-named cuttings in particular have succeeded excellently. From the herb raised from them and sent to Berlin, Thoms has obtained 0.862 per cent. oil, calculated for the dry drug. The table below gives the properties of the South African oil as well as of that distilled at Dahlem and of an oil distilled in Japan. The high menthol-content of the African product (84.83 per cent.) is worthy of attention.

	I. Old Jap. oil (dist. in Japan).	II. Oil from herb grown in German S. W. Africa.	III. Oil from herb grown at Dahlem (summer 1911).
d	0.9043 (18°)	0.9032 (22°)	0.8954 (22°)
a_D	−36.25° (23°)	−35° (24°)	−34.75° (25.5°)
Acid v.	4.05	2.99	4.01
Ester v.	27.73	4.68	12.744
Ester v. after acet.	289.5	304.8	283.25
Esterified menthol	7.74%	1.302%	3.546%
Free menthol	72.77%	83.528%	75.271%
Total menthol	80.51%	84.830%	78.817%
Sal. p.	cannot be determined	+ 20° to 20.5°	+ 14.5°

—Schimmel's Rep., Oct., 1911, 73; from Apoth. Ztg., xxvi (1911), 680.

Plectranthus Glaucocalyx—Presence of a Harmless Bitter Principle.—According to S. Yerge, *Plectranthus glaucocalyx*, var *japonicus*, which is used by the natives in South Japan as a domestic remedy for gastric complaints, contains a crystalline bitter principle, which the author has named—

Plectranthin, melting at about 200°. The aqueous solution of this is not precipitated by lead acetate, nor by tannin, but is thrown down by basic lead acetate. It has no reducing action on alkaline copper solutions, nor on ammoniacal silver reagent. It is an intense bitter; the taste is perceptible in a dilution of 1 : 400,000. It is practically inert on animals, and both the bitter principle and the plant may be used as harmless bitter tonics.—Pharm. Journ. and Pharmacist, March 4, 1911, 297; from Archiv. Internat. Pharm., 1910 (2), through Nouv. Reméd., *28* (1911), 13.

Sage Leaves—Microscopic Examination of the Powder.—H. Solereder

directs attention to the crystal sclerenchyme formed at the lowest extremity of the leaf-sheath of sage as being a characteristic element in the microscopic examination of powdered sage leaves. These sclerenchyme crystals which are comprehensively described and illustrated, are present in the leaf in very small quantity only, but are quite abundant in axils of the leaves and the stems of the plant. In the powder prepared from leaves alone, in which the leaf-sheath is frequently missing, this crystal sclerenchyme is correspondingly small in quantity. Hence, when the microscope reveals them in abundance in the powder, it is conclusively evident that the powder contains stem fragments in admixture.—Arch. d. Pharm. *249* (1911), No. 2, 123–127.

Sweet Marjoram—Adulteration.—E. Collin finds that two sorts of sweet marjoram are supplied in commerce, consisting of the dried flower and leaves of *Origanum majorana* and *Origanum vulgare*, respectively, either in form of powder or broken up by stripping from the stems. The latter form lends itself particularly to its adulteration, which generally consists of the dried leaves of plants devoid of aromatic odor. In a sample examined by the author three different kinds of leaves could be recognized on boiling the drug with 5 per cent. solution of alkali. According to Netolitzsky, the leaves of *Cornus sanguinea* are employed as adulterants of this drug. —Pharm. Ztg., lvi (1911), No. 57, 576; from Ann. Falsific., 1911, through Chem.-Ztg., 1911, No. 76.

CONVOLVULACEÆ.

Scammony—A Fraudulent French Product.—P. Guiges has examined a sample of scammony recently offered in Paris as "pure resin of Aleppo scammony, titre 87 per cent.," which was in reality prepared in France. The first impressions were good; the product was a clear brown resin, slightly opaque. The solution in ether was without turbidity, and it only left a slight pulverulent residue insoluble in alcohol. Shaken with cold or hot water, nothing soluble was taken up. These preliminary experiments seemed to indicate that the material was not aleppo scammony, but industrial resin of good appearance. Analysis gave the following results: Moisture, 4.50; insoluble in ether, specific gravity, 0.720, 11.48; soluble by difference, 84.02 per cent. The rotary power of the purified and decolorized resin was 22° 58. The residue insoluble in ether and in alcohol was found to be finely-powdered scammony root, in which the characteristic round starch grains were identified, as well as the rhombohedric crystals of calcium oxalate. The author thus concludes that the product is not Aleppo scammony, but brown commercial resin containing scammony root in impalpable powder, and is, as he says, a veritable fraud.—Pharm. Journ. and Pharmacist, Aug. 5, 1911, 201; from Bull. Sci. Pharmacol., June, 1911, 327.

Scammony aud Resin Scammony have been subjected to a comprehen-

sive study in a paper contributed by H. Engelhardt and M. R. Schmidt, which appears in " Proceedings," 1910, 1023–1031.

Scammony, Orizaba, and Jalap Resins—Acid and Saponification Values. —G. Weigel does not agree with Taylor that the saponification values of Levantine and Mexican scammony resins form reliable data for their distinction, that of the latter being invariably below 190 and that of the former much higher, 238 to 240. He finds that these figures are by no means so definite as Taylor has supposed. Although some samples of Orizaba resin have figures approaching to, or below, 190, others have had much higher saponification values. Eight samples of the resin have been examined; the lowest saponification value obtained was 179.71; the highest 228.68. On the other hand Taylor's figures for the saponification value of Levant scammony resin are taken to be much too high. For this the author supports the data of Kremel, who has found the saponification number 185.6 for the resin extracted from true scammony root and 180.2 for Aleppo scammony resin. Wiegand agrees, however, that the acid value is an extremely useful criterion for the detection of foreign resins. In both Levantine scammony and Orizaba resin the acid value does not exceed 30; and in true jalap resin 20 is the limit. The saponification value of the last-named resin is found in ten samples to vary from 162.86 to 184.80. As throwing a possible light on the discrepancies found in the figures of different observers, Weigel indicates the method of procedure. He shows that when the saponification liquid is titrated back while hot the figures obtained are always markedly lower than if this operation is delayed until the liquid has cooled. Thus two jalap resins saponified with $\frac{N}{2}$ KOH solution for one hour and titrated back, while hot, with $\frac{N}{2}$ HCl gave the saponification values 162.8 and 184.8; the same resins, similarly treated, but titrated back after cooling, gave the higher values 182.0 and 210.6 respectively. The back titration should always be performed in the hot saponification liquid.—Pharm. Zentralh. *51* (1910) No. 721.

Jalap—Method of Assay.—Horace North, basing his method on the definition that resin of jalap is that portion of the drug soluble in alcohol and insoluble in water, elaborately describes a process of assay, the details of which depend upon several important considerations: (1) The complete extraction of the cell-contents of a drug depends on the permeation by the solvent of every cell; hence the necessity of first reducing the drug to a (very) fine powder. (2) If strong alcohol is added directly to a finely powdered drug, the particles contract to such an extent that the menstruum percolates but slowly, if at all. (3) When the powder is moistened with water (as described in the assay process), it swells to nearly twice its original volume, the particles coalesce to form tiny granules which persist even after the addition of alcohol and heating, and the subsequent draining and washing of the drug in the percolator proceeds with

great rapidity. (4) The proportions of alcohol and water employed in the proposed assay process under consideration for the hot maceration, are such as to produce a menstruum containing about 90 per cent. of absolute alcohol, which appears to be a more efficient solvent than an alcohol of higher percentage. The details of manipulation are such that their description cannot be condensed and must therefore be consulted in the original.—Amer. Journ. Pharm. Nov. 1911, 515–517.

Ipomoea Horsfalliæ, Hook.—*Chemical Examination of the Tuberous Root.*—Frederick B. Power and Harold Rogerson have made a chemical examination of a very large tuberous root from the West Indies, where it is said to be used for starch-making, although it produces a yellow product, and that it is also used for food in some instances. From specimens of the flowering plant received from Jamaica, this root was identified by Mr. E. M. Holmes as being derived from *Ipomoea horsfalliæ*, Hook. It is represented on a plate illustration in half size, accompanying the authors' paper, its length being 0.38 M., circumference (at the thickest part) 0.37 M., and weighed 2395 Gm. Sliced and dried in a water oven, it lost nearly 83 per cent. of this weight. The presence of starch in abundance was revealed under the microscope. It yielded to alcohol 2.5 per cent. of resin calculated on the dried root, or 0.4 per cent. of the weight of the entire fresh root. The crude resin yielded 64.7 per cent. to petroleum (b. p. 40°–60° C.), 25 per cent. to ether, and 8 per cent. to alcohol when successively treated by these solvents. The aqueous extract revealed traces of a blue fluorescent body, probably β-methylaesculetin [$C_9H_5(CH_3)O_4$], a substance which the authors have previously shown to be a constituent of Jalap resin. It contained also a quantity of sugar, since it readily yielded *d*-phenylglucosazone, melting at 213°–214° C. From pharmacological experiments made by Dr. H. H. Dale, of the Wellcome Physiological Research Laboratories, the resin was shown to possess no purgative action in dose of 1 Gm. administered to a small dog. It follows from this and the results of the chemical investigation that the root of *Ipomoea horsfalliæ*, Hook., does not contain any constituent which would render it of medicinal value.—Amer. Jour. Pharm., Aug., 1910, 355–360.

POLEMONIACEÆ.

Phlox Ovata, L.—(*Phlox Carolina*, L.)—The histology of the rhizome and roots is the subject of a paper by Henry Kraemer, in "Proceedings," 1910, 999–1004.

BIGNONIACEÆ.

Gelsemium Rhizomes—Determination of Aesculin by Micro-sublimation.—O. Tunmann, having determined that aesculin is readily obtained as a characteristic micro-crystalline sublimate at comparatively low temperatures, proposes micro-sublimation for quickly establishing the identity of

the rhizomes of *Gelsemium sempervirens* which contain considerable quantities of this glucoside. He finds that the best sublimates are obtained at a temperature of 50°–60°, although aesculin may be obtained as a sublimate at as low a temperature as 40°. Aesculin is contained both in the wood and the bark of the rhizome, and a section weighing only a few centigrams suffices to obtain a strong sublimate, which, at the temperatures indicated is colorless, while at higher temperatures the sublimate is yellowish and impure. The identity of the micro-crystalline aesculin is then readily confirmed by the known tests, for which purpose Sonnenschein's reaction is recommended by the author.—Apoth. Ztg., xxvi (1911), No. 77, 812–814.

Oil of Sesamum—Reasons for its Restoration to the U. S. P.—At the 1910 meeting of the N. Y. State Pharmaceutical Association, Otto Raubenheimer read an elaborate paper on the history, properties and uses of oil of sesamum, which was official in the U. S. P. from and including the revisions of 1830 to 1890, but was deleted from the 8th revision—possibly with some truth for the statement quoted by the author that the step was taken because it was the general opinion of the majority of the members of the revision committee that sesame oil was *antiquated* and was *no longer in use*. Mr. Raubenheimer admits that oleum sesami (or benne oil, gingelly oil, gingilli oil, or teel oil) is very old, if not *the oldest oil* known; for already Herodotus (born 484 B. C.), the father of history, states that it was the best oil known at the time. The present paper is a plea for its restoration to the U. S. P., and he amply supports this plea by pointing out its superiority over other oils for the pharmaceutical uses at present made of them, and brings abundant experimental evidence that should make this convincing. Thus, it has the following advantages over cottonseed and olive oils: (1) It does not readily turn rancid. (2) It is easily saponified even by cold process. (3) It is a non-drying, or rather, a semi-drying oil. (4) It is not gummy or sticky. (5) It is more readily absorbed by the skin. (6) It is thinner (less viscous) than cottonseed oil, although of the same specific gravity. (7) It does not congeal until —5° C., and solid particles do not separate until —3° C. (8) Its price is reasonable. Emphasizing that he has no commercial interest in sesame oil, Mr. Raubenheimer explains his great interest in its restoration to pharmaceutical favor because through years of experiments he is convinced that it preeminently deserves it both from a practical and scientific standpoint. Proc. N. Y. State Pharm. Assoc., 1910, 189–195.

GENTIANACEÆ.

Erythrea Centaurea—Constituents of the Herb.—From the aqueous extract of the herb of *Erythrea centaurea,* R. Reis obtained erythrocentaurin ($C_{10}H_{10}O_3$), crystallizing from absolute alcohol in colorless prisms, melting at 145° C., colored red by exposure to light without altering the

melting-point; a new substance of lactonic nature, $C_{10}H_{10}O_4$, melting at 225°–275° C. (?). In addition to these constituents, the drug contains a phytosterol, $C_{26}H_{34}O$, melting at 79° C., also ceryl alcohol, with stearic and palmitic acids. The glucoside erytaurin, described in 1908, could not be detected.—Apoth. Ztg., xxvi (1911), No. 15, 148.

Gentian Root—Changes during the Vegetation Period.—M. Bridel makes some interesting observations concerning the changes in chemical constituents of gentian root during the vegetation period of one year. He finds that considerable variations occur during this period, particularly in the direction of the carbohydrates hydrolyzable by invertin. In the case of gentiopicrin these varations are not appreciable, the roots containing constantly at least 2 per cent. of this glucoside. The quantity of carbohydrates hydrolyzable by invertin, however, which at the beginning of the vegetation period amounts to 1.2 per cent., was found at the end to be 7.8 per cent. Gentianose is always present in the amount of 3–5 per cent., except during the months of May and June, at which period the root contains gentiobiose, and that the content of gentianose is greatest during the months of August and September. The greatest variation, in fact, is shown in the saccharose content, which accumulates towards the end of the vegetation period and disappears completely at the beginning of the next, as does also a large portion of the gentianose.—Pharm. Ztg. lvi (1911), No. 29, 295; from Journ. de Pharm. et Chim., 1911, No. 6.

Gentiana Pneumonanthe—Gentiopicrin a Constituent of all parts of the Plant.—E. Bourquelot and M. Bridel report the presence of gentiopricin in all parts of *Gentiana pneumonanthe*, a small species with blue flowers growing in peaty marshes. The glucoside is most abundant in the roots. —Pharm. Journ. and Pharmacist, Sept. 24, 1910, 392; from Journ. de Pharm. et Chim., 1910, *2*, 149.

APOCYNACEÆ.

Adenium Coetaneum—The Source of the Arrow-Poison of the Watingas. —From material sent from German East Africa, the botanical source of the arrow-poison of the Watingas has been referred by Professor Gilg to *Adenium coetaneum*. The active toxic principle is a glucoside, very soluble in water, giving a fine violet color with strong sulphuric acid.—Apoth. Ztg., xxv (1910), No. 77, 742.

Strophanthus—Historical Notes.—Prof. John Uri Lloyd traces the history of strophanthus from the time when the genus *Strophanthus* was first established (by De Candolle, 1802) to the present. *Strophanthus hispidus* was one of the four species described by De Candolle, to which the drug was at first ascribed. Subsequently it was found that an arrow-poison, called "kombe" or "gombe," used on the east coast of Africa, was derived from a species of *Strophanthus* which at first was believed to be

identical with the species *S. hispidus*, D. C. but was shown by Oliver (1885) to be distinct from the latter which justified the establishment of a new species, *Strophanthus kombe*.—Bull. Pharm., June, 1911, 242.

Strophanthus—Improved Method of Assay.—Alexander Gardner prepared a tincture according to the pharmacopœial method from a quantity of *Strophanthus kombé* seeds, which had been exhausted, first with purified benzin, by percolation, to remove fat, then with ether in the same way, to remove the resin and any remaining fat. Ten portions of this tincture, each measuring 10 Cc., were separately evaporated to a soft extract. Each portion of extract was triturated thoroughly with 10 Cc. of 95 per cent. acetone, the liquid poured off, and the trituration repeated with another 10 Cc. of acetone. At this stage the mass began to get brittle and it was necessary to break it up with the pestle. The second acetonic liquid was poured off into the first and the trituration again repeated with a third 10 Cc. of acetone, the liquid being added to the mixture of the first two. Three small funnels were taken, each plugged with a bit of absorbent cotton. A layer of clean sand, about two-thirds of an inch deep, was poured on the cotton plug and packed firmly, and on top of this was packed an inch layer of equal parts of clean sand and powdered animal charcoal, a half-inch layer of sand being poured on top of this. The mixed acetonic liquids from one of the portions of the soft extract were poured into one funnel; and after passing through the filtering medium were filtered in a like manner through the second and third funnels in turn, each filter being subsequently washed with acetone until the colate had no perceptible bitter taste. The filtered original liquid and the washings were mixed and the liquid allowed to evaporate spontaneously in a porcelain capsule. The residue after evaporation was washed with three 10 Cc. portions of ether, and then heated to 110° F., for about five minutes and weighed, this weight being the amount of glucosides contained in the original 10 Cc. of tincture. By dissolving the residue in a minimum quantity of water and pouring the solution carefully into absolute alcohol the strophanthin is precipitated in the form of a white or faintly-yellowish powder. The yield of glucoside, responding to all of the U. S. P. tests for strophanthin, ranged in the ten experiments from 0.075 to 0.082 Gm., or an average of 0.079 Gm. The pharmacopœial quality of the animal charcoal and complete washing of the sand used in this experiment are essential to the success of the method.—Drugg. Circ., August, 1911, 403.

Strophanthus—its Standardization—is the subject of an experimental study by H. Engelhardt and H. W. Jones, which appears in "Proceedings," 1910, 1044–1047.

Strychnos Species—Examination of Several New Species for Strychnine and Brucine.—A. F. Sievers has examined the seeds and fruits of three

species of *Strychnos*, namely, *S. Quaqua*, Gilg., *S. Tonga*, Gilg., and *S. spinosa*, Lam., to ascertain the amount of strychnine and brucine contained in them. All three species are native to tropical Africa, the first two being sent directly from Amani, German East Africa, the third (*S. spinosa*) coming from Florida, where the species was introduced a number of years ago. The material for the examination was secured through the office of Seed and Plant Industries. The seeds of only one of these species, *S. Quaqua*, contain weighable quantities of alkaloid, which proved to consist essentially of brucine. The other two contained mere traces, too small for quantitative estimation. The fruits of all three species are edible, the pulp being free from poisonous constituents. The author appends a tabulated exhibit of those species of strychnos, which have been reported on as to their content of strychnine and brucine.—Midl. Drug. and Pharm. Rev., June, 1911, 233–236.

Strychnos Kipapa—Alkaloidal Constituents.—According to Vinci, the bark of *Strychnos kipapa* contains 5 per cent. of strychnine; the root wood 0.1 per cent., the stem bark yields 2 per cent., and the true wood 0.16 per cent. The amount of brucine present is smaller, except in the leaves, where it reaches 0.5 per cent.—Pharm. Centralh. li (1910), No. 36, 828.

St. Ignatius Bean—Alleged Production by Two Different Species of Strychnos.— In an article on *Strychnos Ignatii* and other East Indian and Philippine species of *Strychnos*, by Mr. A. W. Hill, Assistant Director of Kew Gardens, published in the *Kew Bulletin*, the author attempts to clear up the statement that the St. Ignatius bean is produced by two species of *Strychnos*. A figure of *S. Ignatii* with dissection of the flowers was published in the *Icones Plantarum*, tab. 2,212, in April, 1892, derived from the material collected in Samar and Mindanao, in the Philippine Islands. The collector, Boxall, stated that there is another species of St. Ignatius bean more plentiful than the plant he sent, and that it is the seeds of this plant which are exported as St. Ignatius beans. The problem to be solved, therefore, was, whether the plant figured in the *Icones* or the other plant had the best right to be called *Strychnos Ignatii*, and whether the seeds of the other plant really correspond with those met with in European commerce. Mr. Hill has been in correspondence with Mr. E. D. Merrill, the botanist to the Bureau of Science at Manila, but as the flowers and fruit cannot be collected at the same time there is always the difficulty that unless a part cular plant can be permanently marked it is almost impossible to make sure that both flower and fruit come from the same plant, and although in May, 1910, a leaf and detached inflorescence of a plant from Samar were brought in by a collector named Guerrero, with the report that the plant had large fruits which contained "poisonous seeds," and the inflorescence was apparently that of *S. multiflora*, Benth., until the fruit and seeds are obtained it cannot be determined whether or

no these seeds correspond with the St. Ignatius beans in commerce, most of the Asiatic species of *Strychnos* having, so far as is known, poisonous seeds. The evidence that exists seems, however, to point to a second species yielding these seeds. Mr. Hill has, however, been able to revise the East-Indian species of the genus *Strychnos*, and he shows that much confusion existed concerning some of the species, *e. g.*, that *S. ligustrina*, Blume, which has been referred to *S. Nux-vomica*, is a distinct species, and that a Malayan species which had been confused with the Upas tree, *Strychnos Tieuti*, is distinct. He has separated this species under the name of *S. pseudo-Tieuti*. A Fijian species referred to *S. Colubrina* he has shown to be distinct, and has named *S. Vitiensis*. These are the only species, except *S. Gantheriana* (which yields Hoangnan bark), of interest from the medicinal point of view, but the tables of geographical distribution of the East-Indian species and the analytical key to them will be most useful to botanists working at the genus, since no less than nine new species are described by Mr. Hill.—Pharm. Journ. and Pharmacist, Oct. 7, 1911, 460.

SAPOTACEÆ.

Bassia Latifolia—Chemical Examination of the Flower.—Reginald Bennett subjected the flower of *Bassia latifolia*, Roxb., a large tree indigenous to the Central Provinces of India, to chemical examination. The material contained an average of 18 per cent. of water and yielded 2.6 per cent. of ash, which, however, consisted largely of sand adhering to the corollas. The proteids amounted to only 0.7 per cent., but the flower contained an enormous amount of sugar, 49.8 per cent. being determined as invert sugar by direct titration with Fehling's solution, and, after inversion of the sucrose in the usual manner an additional amount, equivalent to 13.4 per cent. of cane sugar, was determined, making a total of over 63 per cent. of the weight of the air-dried material.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1910, 444–445.

Illipi Nuts—Economic Value of their Oil-Content.—In a paper by Kesava Menon on some East-Indian fats and oils, the fat of illipi (illipei, or illupi) nuts, known as "illipi butter," is mentioned as a valuable product suitable for the manufacture of soaps and candles, as well as for other economic purposes. Illipi nuts are the seeds of *Bassia longifolia* (N. O. *Sapotaceæ*) a plant growing in Southern India and the Malay states. The fruits are about the size of a peach, and contain one to four ellipsoidal, or sometimes almost globose, whitish seeds or nuts. The shell, or testa, where it has not been broken during transit, is of a bright chocolate appearance, usually smooth, but it may be much wrinkled. Frequently the outer portion of the shell has been rubbed off, thus exposing the duller inner portion. In most cases, however, the seed is without shell, the kernel being smooth or slightly wrinkled and dark chocolate to almost

black, except where adherent dust causes it to become brown or grey. The nuts average ½ to 1 inch in length, few being longer, and usually mouldy. The kernels can be split into two hard halves or cotyledons with concave adjoining surfaces. The seeds show various stages of germination, and vary considerably in size. They yield by expression on a commercial scale 43 to 45 per cent. of a whitish-yellow or greenish-yellow solid fat, melting at 42° C. (107.6 F.) and solidifying at 36° C. (96.8° F.). As the fat contains a large proportion of stearin (80 per cent.) it is especially suited for candle making. Another species of *Bassia*, *Bassia latifolia*, which forms gregarious forests in Central India, yields the so-called Mowrah butter, melting at 24°-25° C. (75°-77° F.). This fat is also suited for candle or soap making. The oil is used as food, but it soon becomes rancid in the hot climate. The nuts are smaller and less rounded than those of *B. longifolia*.—Chem. & Drug., Mar. 11, 1911, 90.

STYRACEÆ.

Siam Benzoin—Botanical Source and Collection.—Hartman Rordorf, having received from Dr. Domeller Nicuwenhuis, who is the Dutch Minister to Siam, authentic leaves, twigs, bark and resin derived from trees growing in the Northwestern Province of Kiang Mai, in the district near the source of the Meping river, contributes some interesting information concerning the botanical source and collection of Siam benzoin. The leaves are described as 11 inches to 12 inches long and 4 inches to 5 inches broad, leathery, longish-ovate, and acuminate. The margin of the leaf is slightly undulate and entire. The upper surface is of a dark olive-green color and glabrous. The midrib and lateral veins are of a clear brown color and very prominent. The smaller veins are somewhat prominent also. The under surface is of a paler olive-green color filled with abundant appressed stellate hairs. The whole venation is reddish and clearly outlined and covered with stellate hairs. There are five to six lateral veins on each side, nearly at right angles to the midrib, at first curved, and then running along the leaf margin, in which they terminate. The leaf stalks are 1 inch long and colored like the veins, and also covered with stellate hairs. In the axils of the leaves there are small buds and leaflets 1 inch long. Mr. Rordorf lays special stress on the fact that two kinds of buds occur in the leaf axils, that the stellate hairs on the leaves are not the same as those of *Styrax benzoin*, and that the leaves are entire, whilst those of *S. benzoin* are serrate-toothed. The author also describes the method of collecting the drug by the inhabitants of a small settlement—small, long-haired people, who apparently emigrated from China in very early times. They speak an old, forgotten language, and wear different clothes to the natives of Southern Siam. Their method of collecting the benzoin and preparing it for the market is as follows: On trunks of 20 Cm. to 25 Cm. in diameter pieces of bark of rectangular shape from half to four hands-

breadth in size are loosened, and the resin runs out on the inner side of the bark, solidifying there by the heat of the sun. This forms the finest quality. The smaller fragments are formed into lumps by hand. The resin is spread out on a strong mat in a heap, and ginger roots, first hollowed and filled with the marrow of the bones of the pig, are mixed with it, and the mats are tied up at the ends into a bundle. The contents are examined from time to time to see if the fat has been taken up, and if not fresh fat is used. It is said that rancid pork fat will not, like fresh fat, pass through the ginger root. This process takes about one year, its object being to give a fine aroma. When the fat has disappeared from the ginger the drug is ready for export without risk of losing its fine odor through the hot and long journey to Bangkok. The natives rub the gum resin with sugar and then make it into an emulsion with water, which is highly prized as a wash and as an addition to baths.—Schweiz. Wschr. J. Chem. u. Pharm., xlviii (1910), No. 36, 549.

Reviewing the above paper, E. M. Holmes observes that he does not understand Mr. Rordorf's statement that the leaves of the Siam benzoin plant are entire; and that those of the *Styrax Benzoin*, Dryander, are toothed. In the Herbarium of the Society there are plants, referred to *Styrax Benzoin*, Dry., from the late Dr. Treub, of Java, and Mr. H. N. Ridley, of Singapore, but both of these have entire leaves with a slightly undulated margin, but are not serrate. Those of *S. subdenticulatum*, Miq., of West Sumatra, which is doubtfully referred to in 'Pharmacographia' (second edition), p. 407, as being possibly the source of the Penang or storax-smelling benzoin, have leaves that are slightly serrate. This species differs also in having pyriform fruits, whilst those of the Singapore and Java specimens are spherical, the leaf-stalk of Mr. Jamie's specimens of *Styrax Benzoin* being twice as long as those of the *Styrax Benzoin*. Until, however, fruits are obtained it will not be possible to say whether the Siam plant is a distinct and well-marked species or only a geographical variety of *S. Benzoin*. But in the leaf-stalks and the chemical constituents of the balsamic resin it has decidedly a distinct individuality. Professor Greenish has examined the leaf sections of the two plants in the Herbarium, and finds no difference in the hairs, but the epidermis has larger and longer cells in the Siam leaves and the cuticle is thicker than in those of the *Styrax Benzoin* of Sumatra.—Pharm. Journ. and Pharmacist, Oct. 29, 1910, 515.

ERICACEÆ.

Pyrola Rotundifolia—Arbutin a Constituent of the Leaves.—The fresh leaves of *Pyrola rotundifolia* are found by A. Fichtenholz, by the biological method, to contain cane sugar and a glucoside. The latter has been isolated and found to be almost pure arbutin; the minute trace of impurity being, possibly, methyl-arbutin. The material only contains about

1 per cent. of this glucoside. Small amounts of the ferments, invertin and emulsin, also occur; but in such minute quantity that the constituents of the plant are not materially affected by drying, and there is practically as much glucoside in the dry material as in the fresh.—Pharm. Journ. and Pharmacist, Oct. 22, 1910, 492: from Journ. de Pharm. et Chim., 1910, 2, 193.

CAMPANULACEÆ.

Lobelia—History and Remedial Value.—Prof. John Uri Lloyd gives a brief historical account of lobelia (*Lobelia inflata;* Indian tobacco; emetic weed), which was conspicuously introduced by Samuel Thomson in the beginning of the nineteenth century. References to this drug antedating this period are very few, but it is stated by Mattson (1841) that lobelia was used by the Penobscot Indians long before the time of Dr. Samuel Thomson, its reputed discoverer, and there is abundant evidence that lobelia was a domestic remedy with the settlers of North America long before the days of that noted empiricist. It is Prof. Lloyd's opinion that lobelia will yet be shown to be one of the most valuable of all the remedies native to America, and he believes it would now occupy that position in "regular" medication but for its historical connection with the arch enemy of that system, Samuel Thomson.—Merk's Rep., May, 1911, 128.

COMPOSITÆ.

Echinacea—Pharmacognostic Description.—Having secured authentic specimens of crude drug derived from *Echinacea angustifolia,* or the "Nigger Head" of the West, from Professor John Uri Lloyd, and living plants cultivated and growing in the garden of the Philadelphia College of Pharmacy, and thus established their identity, Prof. Henry Kraemer and Maud Sollenberger communicate the results of their pharmacognostic studies of the drug, prefacing the same by a description of the plant and its botanical relations. There are two species of *Echinacea* which are indigenous to the United States. These are known to botanists under the generic name of *Brauneria,* although Hoffmann in his monograph of the Compositæ, still retains them under the genus, *Rudbeckia.* It thus happens that we have three synonyms for the plant under consideration, namely: *Rudbeckia pallida,* Nuttall.—(1834); *Echinacea angustifolia,* De Candolle (1856); and *Brauneria pallida* (Nuttall), Britton (1904).

Brauneria pallida is a perennial herb, somewhat resembling the second species, *Brauneria purpurea,* known as the "cone flower," which is quite extensively cultivated in the gardens. The vertical rhizome and root of *B. pallida* is, however, very much larger than those of the "cone flower." The plant is from 3 decimeters to 1 meter high, the leaves are usually more or less crowded near the base of the stem, and from them arises a a long peduncled head of flowers. . . . The crown of the rhizome is

simple or branched, resembling that of other Compositæ. The underground stem or rhizome attains a length of as much as 12 centimeters, and is from 10 to 15 millimeters in diameter. It is slightly annulate, marked by a number of V-shaped stem scars and circular root scars, but otherwise it is nearly smooth and of a somewhat purplish-brown color. The root continues with the rhizome and extends downward, producing a number of circular branches.

The commercial drug is described as follows: Nearly entire, cylindrical, very slightly tapering, 10 to 20 Cm. long, 4 to 8 Mm. in diameter; externally, grayish-brown, light brown or purplish-brown, slightly annulate in the upper portion, with occasional V-shaped stem scars, somewhat wrinkled longitudinally, or furrowed and sometimes slightly spirally twisted; fracture short, fibrous; internally, bark less than 1 Mm. in thickness, wood thick and composed of alternate light yellowish and black wedges; the rhizome with a circular pith; odor faint, aromatic; taste sweetish, followed by an acrid and tingling sensation resembling that of aconite, but lacking the persistency and numbing qualities of the latter. The authors describe the microscopic elements of the drug, accompanied by illustrations exhibiting the cross-sections of the various parts of the rhizome and roots, the distribution and different forms of stone cells, the contents of the secretory cells, etc., etc.—Amer. Journ. Pharm., July, 1911, 315–325.

Helenium Autumnale—Helenic Acid the Active Principle.—The marked bitterness observed on chewing the flowers or leaves of *Helenium autumnale* prompted E. Reeb to submit the various parts of this plant to examination. Petroleum and chloroformic extracts of the flowers, seeds, leaves, and roots yield to water a substance of pronounced bitterness, crystallizing on evaporation of the vehicle. No alkaloid was detected in the alcoholic extract taken up with water. By a method described, it was found that the flowers yielded 2 per cent. of the crystals of the bitter substance, the seeds 2.55 per cent. The crystals of the leaves are identical with those of the flowers and calyces, and the name *Helenic Acid* has been proposed for the body. It is slightly soluble in carbon disulphide, more soluble in ether, very soluble in acetone and in glacial acetic acid, while water dissolves 1 per cent. of its weight. It melts at 161°. With potassium ferricyanide and ferric chloride, its solution is colored blue; boiled with dilute sulphuric acid it decomposes with formation of glucose. The substance is thus a glucoside. If carelessly handled it violently irritates the nasal mucus membrane, and it is this substance which gives the plant its sternutatory properties. Helenic acid is found in all parts of the plant, but the proportion varies according to the time of collection. The acid has vermifuge properties similar to those of santonin, and the author is making pharmacological experiments in this direction. Pharm. Journ. Pharmacist, Jan. 21, 1911, 65; from Journ. de Pharm. d'Alsace-Lorr., through Nouv. Remèd., Nov. 24, 1910, 511.

Helianthus Annuus—Basic Constituents of the Flowers.—In Russia various parts of the sunflower are in common use for medicinal and other purposes, tinctures prepared from the fresh flowers and leaves being used in domestic practice as a substitute for quinine. In the belief that the activity of the flower depended on alkaloidal substances, E. Buschmann examined an extract prepared from the flowers and stalks of the plant, When this was dissolved in water, fatty and resinous substances separated, which were removed by shaking out with petroleum ether; the aqueous liquid was then precipitated by bismuth-potassium iodide, the precipitate washed and decomposed by lead oxycarbonate, and the alkaloidal solution acidified with hydrochloric acid and concentrated. Crystals of betaine hydrochloride were thus obtained, and after as much as possible had been been removed, the mother-liquor was examined and found to contain choline chloride. The two bases betaine and choline were identified by preparing and analyzing a considerable number of characteristic double salts and other compounds. No other basic substance was found, but it appeared that the proportion of these two bases present was enough to account for the observed activity of the extract.—Archiv. d. Pharm., *249* (1911) No. 1, 1.

Insect Flowers—Nature of Poisonous Principle.—Referring to the investigation of insect flowers, which he undertook in 1880, in collaboration with Schlagdenhauffen, E. Reeb now confirms the original statement that the toxic constituent of the insect acid flowers is an acid, which they had named "pyrethrotoxic acid." To obtain this principle, Dalmatian insect powder is extracted by percolation with petroleum ether. By treating the soft extract left on distilling off the solvent, with a small quantity of alcohol at 60° C., a white powder, melting point 125° C., is separated. This is the magnesium compound of a resin which is named pyrethresin. The resin has an acid reaction. After removing this "pyrethresin," the residue is an oily mass containing an amorphous sugar. The latter is removed by treatment with water. The residual oily substance is partly soluble in 3 per cent. potassium hydroxide solution. On treating this alkaline solution with tartaric acid, and shaking out with ether, that solvent, on evaporation, leaves a honey-like mass of pyrethrotoxic acid. Instead of treating the original petroleum-ether residue with alcohol, it may be extracted with a 60 per cent. solution of chloral hydrate, and the solution thus obtained shaken out with petroleum ether. The pyrethrotoxic acid thus obtained is intensely toxic to insects.—Pharm. Zentralh., lii (1911), No. 7, 173.

Insect Powder—Valuation.—Bernard O. Leubner tested a sample of insect powder which was suspected of being of inferior quality, and probably prepared from the stems instead of from the flowers. Extracted with an excess of ether the powder yielded 5.59 per cent. of a dirty green extract.

According to C. and L. the powder from closed flowers will yield from 8 to 9.5 per cent. to continuous extraction by ether, and open or partly open flowers yield 6.5 to 7.5 per cent. The color of the extract varies from pale yellow, dark yellow, brown yellow to green yellow, while that prepared from the stems is of a dirty green color and the residue of evaporation amounts to only 5.5 per cent.—Merk's Rep., Aug., 1910, 229.

Liatris Spicata, Willd.—Cultivation and Uses.—The failure of attempts (in France) to acclimatize *Liatris odoratissima*, Willd., has induced N. Davis to make culture experiments with the allied North American species, *Liatris spicata*, Willd., which, he now announces, has been successfully accomplished at Marseilles. This is a perennial, which is propagated in May by dividing the shrubs. The stalks bear a profusion of leaves and sprout from a bulbous rhizome. The leaves are narrow, entire, and alternate. Although this plant contains less coumarin than does the familiar *Liatris odoratissima*, it is nevertheless very serviceable for scenting tobacco, linen, and as a perfume for domestic purposes generally.—Schimmel's Rep., Oct., 1910, 160; from "La Parfumerie Moderne," July, 1910, 77.

Matricaria Discoides, D. C.—Increase of this American Species in Europe.—Schimmel & Co. mention that *Matricaria Discoides, D. C.*, a plant resembling German chamomile, but smaller and particularly differing in having much smaller marginal flowers, has acclimated itself in Europe with surprising rapidity since it was introduced from North America, about the middle of the 19th century. It is very common, for example, in Württemburg and in many parts of Alsace-Lorraine, in particular in the neighborhood of railway stations, and has also been observed in the vicinity of Leipzig, where Schimmel & Co. have caused a small quantity to be collected for distilling purposes. From the entire plant, all parts of which appear to contain volatile oil, they obtained 0.15 per cent. of a dark brown oil, studded with paraffin crystals when at ordinary temperature. Its odor is intermediate between that of common and Roman chamomile oil; sp. gr. at 30°, 0.9175; acid val., 18.7; Ester val. 77.5. On account of its fairly considerable paraffin-content the oil did not form a clear solution even with 90 per cent. alcohol. The separated paraffin, recrystallized twice from dilute alcohol, melted between 58° and 61°.—Schimmel's Rep., Oct., 1911, 107.

RUBIACEÆ.

Cinchona—Historical Notes.—Prof. John Uri Lloyd contributes the following brief historical note on cinchona. He says: "Tradition states that the medicinal qualities of cinchona (*Cinchona calisaya*) were known to the aborigines of South America from the earliest times. Arrot (Philosophical Transactions, xi, 1737–8, p. 48) states that the qualities and uses of the bark of cinchona were known to the Indians before the days of the Spanish conquest. Others declare that the Peruvians distrusted the drug,

considering it dangerous; Markham asserting that the native doctors did not employ it. Preceding 1739, a Jesuit missionary, however, was cured of fever by the bark, administered to him by an Indian; a like incident being recorded concerning the Spanish corregidor of Loxa, in 1638, the wife of the Viceroy of Peru, the fourth Count of Chinchon, being attacked by a fever, was cured with powdered bark, which, being commended by her, gave to it the name, 'The Countess's Powder,' or chinchona. Introduced into Spain under the name Jesuit bark, or powder, as well as chinchona, it passed thence into other European countries, being largely distributed by the Jesuit Fathers."—The Apothecary, June, 1911, 25.

Cinchona Leaves—Alkaloidal Content.—P. Van Leersum has examined the alkaloidal content of the normal living leaves and of decaying leaves of *Cinchona succirubra* and *C. Ledgeriana*, also of leaves from which light had been excluded for a long time. The fallen or discolored leaves always contain more alkaloid than the normal living ones; the alkaloid of the cinchona plant must therefore be regarded as an excreted product formed in the leaves or other organs, and not as a secreted product. Rings were cut in the bark of the branches, and the alkaloid determined above and below these rings. The results show that no alkaloid is transferred from leaves to stem.—Pharm. Journ. and Pharmacist, Dec. 24, 1910; 761; from Konikl. Akad. van Wetensch., *19*, 1910, 119.

Cinchona—New Method of Assay.—M. Vigneron proposes a new method for the estimation of total alkaloid in cinchona, which, in brevity, consists in the extraction of the bark with water acidulated with HCl, precipitation of the alkaloids *with a saturated solution of cinchona alkaloids* in mixture of sodium hydroxide and ammonia water, collecting and washing the precipitate on a filter, dissolving the washed alkaloid in a mixture of ether and chloroform, evaporating the solution, and weighing the residue. Absolute adherence to specified directions is necessary, however, to assure concordant results. The author also communicates a method for the determination of the quinine based on the difference in solubility of the neutral chromates of the cinchona bases, which is claimed to give better results than the method described in the "Codex."—Pharm. Ztg. lvi (1911), No. 29, 295, from Journ. de Pharm. et Chim. 1911, No. 3.

Cinchona and Preparations—Precipitation of Alkaloids as Silicotungstates.—Javillier and Guerilhault state that the method of precipitating the cinchona alkaloids as silicotungstates, gives good results in the alkaloid assay of the bark and its preparations. *Quinine silicotungstate* has the formula $SiO_2.12WO_3.2H_2O.2C_{20}H_{24}O_2N_2+7H_2O$. It is a dull yellow powder, which loses 6 molecules of water at 120° C. It has the above constitution constantly when precipitated under different conditions.—Pharm. Journ. and Pharmacist, June 3, 1911, 741; from Bull. Sci. Pharm. *18*, 1911, 93.

Liberian Coffee—Composition.—H. Gorter, who has for some years been engaged in the investigation of the chemical constituents of coffee, has obtained some interesting results with the Liberian variety of the berry. Caffeine does not exist free in coffee, but is combined with potassium and chlorogenic acid. This compound has been isolated in a pure state, in colorless prismatic crystals grouped in bundles. The formula is $C_{32}H_{36}C_{19}K_2(C_8H_{10}N_4O_2)_2 + 2H_2O$. It decomposes without melting at about 225° C. The compound is obtained by percolating Liberian coffee with 66 per cent. alcohol. The percolate thus obtained contains a gummy substance, which is precipitated by the addition of 95 per cent. alcohol. On then concentrating the alcoholic solution *in vacuo* to a syrup, the double chlorogenate crystallizes out. It is purified by recrystallizing from 60 per cent. alcohol. The yield is 3.3 per cent. The salt is scarcely decomposed by dry chloroform, but easily parts with its caffeine to that solvent in the presence of water. This explains why dry coffee only yields about one-tenth of its caffeine to prolonged extraction with chloroform, but readily gives up the whole of its alkaloid to that solvent in two or three hours in the presence of water. The chlorogenic acid from coffee, $C_{32}H_{38}O_{19}$, crystallizes from water in small colorless needles, melting-point 206–207° C.: it is lævorotatory, $a_D - 33.1°$. It is hydrolyzed by alkalies forming caffeic and quinic acids, according to the equation—

$$C_{32}H_{38}O_{19} + H_2O = 2C_9H_8O_4 + 2C_7H_{12}O_6.$$

Besides this the mother liquors, after separating the potassium coffeine chlorogenate, yield another acid, $C_{34}H_{54}O_{15}$, crystallizing from alcohol in orthorhombic colorless crystals, melting at 255° C. It is sparingly soluble in water and in strong alcohol; its taste is sweetish. It furnishes iso-valerianic acid when heated with acids or alkalies. It has been named coffalic acid. In addition to these constituents Liberian coffee contains citric acid, trigonelline, a pectin, and an oxydase. The so-called caffetannic acid of other investigators is a mixture of chlorogenic and coffalic acids with other substances.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 663; from Liebig's Annalen (*338*, 327; *359*, 217; *362*, 237), through Journ. de Pharm. et Chim. 1910, *2*, 69.

Coffee—Poisonous Glazing Material.—In a recent Russian Ministerial Promulgation (Feb. 27, 1911) attention is directed to a glazing material, exploited and recommended under the trade name of

"*Limal*," for improving the appearance of coffee, which contains an appreciable amount of arsenic. Analysis at the Hygienic Institute at Hamburg has shown it to be composed of 1 part of colophonium (rosin) and 2 parts of shellac—the latter containing up to 0.12 per cent. of arsenic, while the rosin was proven to be free from it. It is probable that the arsenic is added in the form of trisulphide (the so-called "auripig-

ment") a yellow coloring matter added for the purpose of improving the color of the glazed coffee.—Pharm. Ztg. lvi (1911), No. 30, 306.

Ipecac—Experimental Study and Review of the Literature.—Some years ago, R. R. D. Cline had occasion to use ipecac and was very much surprised to find that even enormous doses of a syrup and also of a fluid-extract produced little if any vomiting effect. This led the author to make many experiments which gave results, when taken in connection with the showing of the literature (which the author reviews comprehensively), that would seem to warrant the conclusions below given. In his experimental work and studies, covering a period of many years, he has since the summer of this year been assisted by Mr. J. C. Buckner, who made analyses of different samples of ipecac. Mr. Cline summarizes his results and observations as follows:

First. Quite a number of species of ipecac contain no alkaloids.

Second. Different varieties contain different proportions of cephaline and emetine.

Third. The two alkaloids, emetine and cephaline, represent the medicinal activity of the drug.

Fourth. The same variety (same species) contains varying proportions of cephaline and emetine.

Fifth. The pharmaceutical preparations of the drug often deteriorate enormously in activity.

Sixth. While both emetine and cephaline are emetics, the latter is from two to five times more active than emetine.

Seventh. Emetine alone is the active ingredient that stimulates glands.

Eighth. While an analysis of total alkaloids or rather of combined amounts of emetine and cephaline is very valuable, it is not sufficient, as it does not show the relative amounts of cephaline and emetine.

Ninth. Since ipecac and its preparations, though they may, under favorable circumstances, retain their activity for a long while, yet do, at times, rapidly deteriorate, it is necessary to assay from time to time.

Tenth. If kept in a cool and very dry place the drug either powdered or whole, as well as commercial emetine, almost entirely retain their activity.

Eleventh. If further work warrants these conclusions, pure emetine and cephaline in tablet form should be made official and could easily supplant the bulkier and more slowly acting pharmaceutical preparations.

Twelfth. The U. S. P. method of volumetric analysis of total alkaloids is easy, requires few and simple apparatus, and is very reliable.

Thirteenth. The gravimetric extraction, separation and purification of emetine and cephaline is easy, requires few and simple apparatus and is reliable.

Fourteenth. Either the U. S. P. should require a second operation whereby cephaline can be separated from emetime (as for example by a

weak alkaline solution such as caustic soda) and this separated cephaline volumetrically estimated and by difference from total alkaloids determine the per cent. of emetine, or that the gravimetric separation and estimation for total and for each alkaloid be recommended.—Proc. Texas Pharm. Assoc., 1911, 93–102.

Ipecacuanha—Condition of the Powdered Root of French Commerce.—Planchon and Juillet in the course of an examination of forty-eight samples of powdered ipecacuanha root, found that only sixteen met the requirements of the French Pharmacopœia, which restricts the product of powder to 75 per cent. of the weight of the original root taken. In this manner it is intended to avoid the occurrence of an undue proportion of woody fiber in the powder. Another sixteen, although containing no added foreign matter, showed the presence of an undue proportion of tracheids and woody debris, indicating that the whole root, including the greater portion of the meditullium, had been ground to powder. The remaining sixteen samples were more grossly adulterated. They contained ground olive stones in quantity varying from 3 to 40 per cent.—Pharm. Journ. and Pharmacist, Sept. 16, 1911, 383; from Annales Chim. Analyt. *16*, (1911), 310.

Vangueria Spinosa, Roxb.—Poisonous Properties of the Fruit—Quoting from the annual report of 1910–11 of the Industrial Section of the India Museum, David Hooper says that the fruits of this tree, the "Maina," of Assam, are considered to have medicinal properties, and are occasionally eaten, but a large quantity is said to produce poisonous symptons. No cyanogenetic glucoside or alkaloid was discovered in the fruits. They contained sugar, gum, and a trace of tannin. The dried seeds yielded to ether 14.01 per cent. of oil of a semi-drying nature. Its iodine value was 115.07.—Pharm. Journ. and Pharmacist, Sept. 1911, 350.

CAPRIFOLICEAE.

Diervilla Lutea—Fraxin a Constituent.—Charvaux observed that if a fragment of a twig or of the root of *Diervilla lutea* (*D. canadensis*, Willd.) is macerated in water which is slightly alkaline, a solution is obtained which, even when very dilute, has a distinct blue fluorescence. This is due to the presence of a product which the author has isolated in a crystalline state and identified as fraxin, a glucoside first found in *Fraxinus excelsior*, L., and more recently in *F. Ornus*, L., and in several species of *Æsculus* and *Pavia*. The glucoside was extracted from the rapidly dried and powdered roots with boiling 90 per cent. alcohol. The alcoholic solution, which was brownish-yellow and very fluorescent, was distilled, the extract taken up with boiling water (equal in weight to the root taken), and the liquid, when tepid, shaken out with a large quantity of ether, several times. The aqueous liquid then evaporated to half its bulk, gradu-

ally deposits yellowish crystals, which, when purified by recrystallization from boiling water, and then from 60 per cent. and 90 per cent. hot alcohol, and finally from boiling water, are perfectly white. The yield is about 3 per cent.—Pharm. Journ. and Pharmacist, Oct. 7, 1911, 463; from Journ. de Pharm. et Chim., Sept. 16, 1911, 248.

Viburnum Lentago—Proximate Examination of the Fruit.—C. E. Gillette has subjected the fruit of *Viburnum lentago*—the sweet viburnum, wild raisin, or sweet black-haw—to proximate examination. It yielded to continuous extraction with hot alcohol, 56 per cent. of extract, and afterwards to water 2.5 per cent. more of extract. The alcoholic extract consisted almost entirely of sugars (98.5–99 per cent., mainly fructose, with a small quantity of dextrose and of levulose. From the residue of extraction (40 per cent.), 4.25 per cent. of oil was extracted with ether. It was of a beautiful bright amber coler, had a faint but characteristic odor, and a sweetish and mildly penetrating taste. The specific gravity fractions obtained during the 30 days consumed for its extraction, ranged from 0.8654 to 0.9039; on refrigeration it failed to solidify at —24°, becoming only slightly thicker at that temperature. The oil has drying properties. The proteins consisted apparently of a small amount of albumen, the total nitrogen estimated by Kjeldahl's method being 0.14 per cent. The acids consisted principally of malic acid, but exist only in small quantities. The ash amounted to 2.35 per cent.—Chem. News, May 5, 1911, 205.

RHIZOPHORACEAE.

Mangrove Bark—Uses and Constituents.—H. Bocquillon says that there are two classes of mangrove bark, the *red* and the *gray*, which are used industrially as a tanning substance and therapeutically as a remedy for leprosy, both varieties being represented in a number of species, forming trees 4 to 6 meters in height. The red belong to the Rhizophoraceæ, the gray to the Combretaceæ. The species (red) employed in therapeutics are, *R. mangle*, *R. mucronata*, *Bruquiera gymnorhiza*, and *Coccoloba uvifera;* the species (gray) used therapeutically are *Conocarpus erecta*, and *Avicennia tomentosa*. Analysis of the barks of the various species give similar results; the ash is 5.5 per cent., consisting of carbonates and chlorides of potassium, sodium, calcium and iron. The percentage composition of the bark is given as follows:—Wax, 0.335; fatty matter, 0.335; tannin, 20.00; resin, 13.55; starchy matter, 5.00; glucoside, very abundant; alkaloid, none. The red coloring matter becomes cherry-colored with alkalies, turning to yellow, with formation of a precipitate with acids. Mangrove is used in the same forms as cinchona—powder, tincture, soft extract, syrup, wine, and especially liquid extract, and decoction. The dose of the liquid extract is 5 Gms. twice daily, increasing to 30 Gms. twice daily if desired; the dose of the soft extract is from 2 to 8 Gms.

daily. Used in leprosy, it is administered in the form of liquid extract, in dose of 10 Gms. daily in two instalments, increasing by 5 Gms. a day up to 60 Gms. The soft extract is given in 8-Gm. doses daily, but in this form gastric intolerance and giddiness are sometimes produced. The drug is also used in the form of baths and lotions, and the decoction contains 30 Gms. per liter. Amelioration of the disease is observable in fifteen days, but the cure requires a year. Besides its use in leprosy, mangrove is valued in the colonies as an astringent in lotions for eye troubles; internally it is used in diarrhœa and for tuberculosis, while the powdered bark is used as a febrifuge.—Pharm. Journ. and Pharmacist, June 24, 1911, 843; from Rep. de Pharm., May 11, 195.

UMBELLIFERÆ.

Umbelliferous Fruits—Content of Fixed Oil and Its Characters.—Dr. Clemens Grimme has made some interesting investigations concerning the fixed oil content of umbelliferous fruits which in the industrial distillation of the volatile oils is not taken into account and is usually included in the still residues which are utilized either in the moist or dried condition for agricultural purposes, as cattle food, etc. The fixed oils were prepared from the best known of the umbelliferous fruits by extracting them with ether, and after distilling off the solvent heating the residue to drive off the volatile oil as completely as practicable. This treatment did not deprive the residual fixed oil completely of the odor of volatile oil, which however was due to mere traces of the latter and did not interfere with the determination of the physical and chemical characters and constants. They were usually dark colored liquids, having an aromatic taste and odor, variable congealing points, and were obtained in a yield of from 10 to 18 per cent.—a yield that would seem to justify the assumption that, considering the enormous quantities of these fruits that are modernly subjected to distillation, it might prove quite profitable to separate the fixed oil from the still residues, which would remain after suitable treatment for this purpose, quite as valuable for the purposes of cattle-food. The fruits that have been examined by the author are the following: *Carum carvi*, L.; *Petroselinum sativum*, Hoffm.; *Apium graveolens*, L.; *Pimpinella anisum*, L.; *Foeniculum officinale*, L.; *Anethum graveolens*, L.; *Daucus carota*, L.; *Cumium cyminum*, L.; *Anthriscus cerefolium*, Hoffm.; *Coriandrum sativum*, L.; and *Ptychotis ajowan*, D. C.—Pharm. Zentralh. lii (1911), No. 25, 661–667.

Asafetida—Quality and Examination of the Drug at Present on the Market.—W. H. Pearson observes that when the Food and Drug Act first went into effect there was considerable improvement in the quality of asafetida imported to this country, but that after a few lots of inferior quality failed to be deported, European merchants declared that the best grades were unobtainable in sufficient quantity. He illustrates the diffi-

culty to get representative samples of the gum by his experience with a sample consisting of several lumps, pounded in an iron mortar to secure fair uniformity, which showed 24.8 per cent of ash and yielded 50.86 per cent. of alcohol soluble matter; but when the same case was resampled later, the average of four results showed 23.2 per cent. of ash and 54.5 per cent. of alcohol soluble material. The latter determination was made by shaking 10 Gm. of the sample for several hours with 150 Cc. alcohol in a mechanical shaker, filtering, washing the insoluble portion with excess of alcohol, and evaporating to constant weight at 100° C.—Proc. Penn. Pharm. Assoc., 1910; Amer. Journ. Pharm., Febr., 1911, 77.

Asafetida—Comparative Value of "Tears" and "Mass"—In a paper read at the 1910 meeting of the British Pharmaceutical Conference, John C. Umney and Sidney W. Bunker describe and give the results of a series of experiments undertaken to determine the percentage of volatile oil in asafetida, the respective percentages in the "tears" and "mass," and the differences, if any, in the chemical composition and therapeutic value of the oils obtained. They find that the percentages of oil in the "tears" is generally slightly lower than in the "mass," the variations in both being from 12 to 16 per cent. There is, however, a much higher percentage of sulphur in the oil from the "tears," namely 10.44 per cent., the oil from the "mass" containing only 2.06 per cent. The oil from the "tears" is richer in sulphur compounds, such as $C_7H_{14}S_2$, $C_8H_{16}S_2$, $C_{10}H_{20}S_2$, and $C_{10}H_{18}S_2$, which Semmler was able to isolate from asafetida oil, while the oil from the "mass" contains a large proportion of the bodies not containing sulphur, that is, the two terpenes, the sesquiterpene, and the oxygenated body $(C_{10}H_{16}O)n$, which Semmler also recognized as being present. Regarding the therapeutic value of the drug, if, as most authorities aver, this is almost entirely due to the subjective effect produced in virtue of the abominable taste and smell, the authors do not agree with Dietrich that the "mass" is preferable to the "tears" for pharmaceutic purposes. If, however, the chief effect is ascribed to the stimulant action on the walls of the stomach and intestines, it is possible that the use of the "mass" may be as advisable as, or even better than, the use of the "tears" in pharmacy. They think that systematic therapeutic experiments should be conducted with the oils, or for convenience with standard tinctures prepared with 90 per cent. alcohol.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy) 1910, 418–428.

Bupleurum Fruticosum, L.—Variation of Volatile Oil at Different Periods, etc.—The oil of *Bupleurum fruticosum*, L., a plant which grows wild and abundantly in the island of Sardinia, has been the subject of study by L. Francesconi and G. Sanna, who distilled the oil from material in various stages of maturity and in different localities. In accordance with these variations, the yield varied from 0.5 to 4.4 per cent., while the constants

of the oils obtained varied as follows: Specific gravity at 15° C., 0.8257 to 0.8692; opt. rot., + 19°72′ to 45°50′; n_D, 1.4783 to 1.4882; sap. val., 5 to 14; sap. val. after acetylation, 23.7 to 28.5. The oil consisted chiefly of hydrocarbons; it contained only small proportions of alcohols and esters. It was found that the oil-content increases as the plant reaches maturity, and that the flowers contain more oil than the leaves. Plants gathered at high altitudes contain more oil than do those from the plains. The density, optical rotation and index of refraction increase as the plant develops; they attain their maxima during the flowering period, at the end of which they diminish again. The ester-content of the leaves diminishes during the flowering and is largest in the plants from the mountains. The leaf-oils contain more ester than do the flower-oils; plants grown in a moist atmosphere are deficient in ester. The sp. gr. of oils rich in ester is higher, and their rotatory power lower than that of oils which are deficient in ester. The flowers contain a larger proportion of free alcohol than the leaves and during the flowering period the content of free alcohols increases at the expense of that of the alcohols in combination.—Schimmel's Rep., Oct., 1911, 23; from Gazz. chim. ital., *41* (1911), 1, 395.

Heracleum Spondilium—Use of the Petioles as Food and for Preparing Alcoholic Beverages.—C. Hartwich says that the petioles of *Heracleum spondilium* have been used from time immemorial on the western coasts of North America, in Kamtschatka, in North Asia, in Russia, in Poland, in Lithuania, and even in Silesia, for the preparation of alcoholic beverages. Under the name of "Vin de Berce," an account of such a beverage is given by Bauhin and Cherler in 1619, who state that the Poles and Lithuanians ferment the leaf-stalks and fruits with yeast, the beverage thus produced being drunk by the poor instead of beer. Later Martin Kerger mentioned the same beverage under the name of "Bartsch." It is not only used as a beverage, but also to prepare the Russian soup known as "Borchtsch." In Kamtschatka, the natives call the plant "Utschkui," the "sugar plant." They dry the petioles and radical leaves which become covered with a sweet powder; this is collected and known as "Ahakatka." Forty pounds of material yield about 125 Gms. of this saccharine substance. In Russia a spirit is obtained by fermenting and distilling an infusion of the petioles from which the outer skin has been removed; the berries of *Lonicera cerulea* or myrtle berries are added to the mash. It is stated that, when rectified, the spirit obtained is more palatable than the native corn spirit. It is necessary to remove the outer portions of the leaf stalks, otherwise the spirit will be poisonous. Sometimes the fermented liquor is consumed before distillation, but in this state it is extremely intoxicating.—Pharm. Journ. and Pharmacist, Dec. 9, 1911, 779; from Journ. de Pharm. et Chim., (Append.) *4* (10) 38.

Œnanthe Crocata L.—Proximate Examination.—Frank Tutin has sub-

jected *Œnanthe crocata*, L., a poisonous umbellifera common in England and Western Europe, to proximate examination, the material consisting of the entire dried plant which had been specially collected for the purpose in early spring, and therefore represented chiefly by the tuberous roots. These, which somewhat resemble parsnips, were found to be devoid of enzyme, and no part of the plant, at any stage of growth, contained an alkaloid. An alcoholic extract of the plant, when kept for some time, deposited an amount of crystalline cane sugar equivalent to 3.8 per cent. of the weight of dried material employed. This extract, when distilled in a current of steam, yielded a yellow essential oil possessing a somewhat unpleasant odor. This oil had the following constants:—d 15°/15° 0.9381; a_D + 1° 16′ in a 25-Mm. tube. From the portion of the alcoholic extract which was soluble in water there were isolated a small amount of a colorless crystalline substance (m. p. 83°), which, on keeping, assumed a purple color, and some salicylic acid. It also contained some amorphous products and a very large amount of dextrose and lævulose. The portion of the extract which was insoluble in water consisted of a dark-colored, viscid resin amounting to nearly 3 per cent. of the weight of the plant employed. From this material the following compounds were isolated:—Triacontane, $C_{30}H_{62}$; hentriacontane, $C_{31}H_{64}$; a phytosterol (m. p. 135°); ipuranol, $C_{23}H_{38}O_2(OH_2)$; palmitic acid; and a mixture of unsaturated acids consisting chiefly of linolic acid. The greater amount of the material insoluble in water was, however, of a resinous nature. The neutral portion of the petroleum and ether extracts of this resin represent the toxic principle of the *Œnanthe crocata*.—Pharm. Journ. and Pharmacist, Aug. 26, 1911, 296–298.

RANUNCULACEÆ.

Ranunculaceous Plants—Chemical Investigations of Several Species.—O. Keller reports the results of his chemical investigations of a number of ranunculaceous plants. He finds that the roots of

Helleborus niger, and probably those of *H. viridis* also, contain no alkaloid. The former has yielded the author 0.045 per cent. of the glucoside helleborin in crystals melting at 269–270° C. Neither the flowers, herb, nor seeds of *Aquilegia vulgaris* are found to contain alkaloid. The herb of *Caltha palustris* gave a small amount of non-volatile base, which cannot therefore be identical with nicotine, as Johannsen has stated. It forms a crystalline hydrochloride and platinochloride. Contrary to the experience of Masing, who isolated a base, calcatrippine, from the flowers of *Delphinium consolida*, the author finds these flowers to contain no alkaloid. The seeds of the plant, however, yield three alkaloids. One of these crystallizes from alcohol in thick tablets melting at 195–197° C., but it readily becomes decomposed on further treatment to a transparent amorphous mass. Crystalline salts have not yet been obtained. This base is soluble

in ether. Another alkaloid is amorphous and almost insoluble in ether. The third alkaloid, also amorphous, is readily soluble in that solvent. The crystalline base is not identical with Merck's pure crystalline *delphinine*, which is separable by recrystallization from alcohol into six-sided tablets melting at 187.5° C., and into pointed aggregated needles which have no sharp melting-point, yet fuse at a higher temperature than the tablets.—Arch. d. Pharm., 248 (1910), 463–468.

Aconite—Chemical Assay.—It has been frequently stated that the chemical assay of aconite is unreliable. Professor A. B. Stevens has previously proven this to be untrue, except in preparations of the drug that have been prepared by heat. Statements are also made to the effect that the method is unreliable for the old or deteriorated drug, or its preparation. These statements do not seem to be based so much upon experimental evidence as on the fact that, chemically, aconite is known to split into bases naturally expected to neutralize acids; hence, to give erroneous results by titration. Professor Stevens has now completed some investigations and reinvestigations, taking into consideration also the physiological assay of Squibb, from which he reaches the following conclusions:

1. That aconite properly kept does not deteriorate.

2. That when deterioration takes place through improper care such deterioration may be detected by chemical assay.

3. That when deterioration is due to heat the weight of ether-soluble residue is increased, the basic properties decreased, hence the deterioration is easily detected by volumetric assay.

4. That the Squibb test is valuable for comparison, but is not suitable for pharmacopœial standardization to be used by different individuals.

5. That chloroform should not be used in the assay of aconite.

6. That the chemical assay is not scientifically exact, but is sufficiently accurate to be used in determining the quality of aconite and its preparations.—Bull. Pharm, June, 1911, 237–239.

Cimicifuga (Macrotys)—Evolution of its Botanical Titles.—In a brief historical note on cimicifuga, in which he mentions that the plant is abundantly distributed over the greater part of the United States east of the Mississippi, except in New England and the extreme South, Prof. John Uri Lloyd states that it was observed by the earlier European travelers in America, being carried to England in 1732, although previously (1696) by Plunkenet. All pre-Linnæan writers classed this plant with *Actæa*, mostly under Tournefort's name *Christopheriana*. Linnæus gave it the name *Actæa racemosa*, under which it was classed until Pursh referred it to the genus *Cimicifuga*. Rafinesque (1808), owing to the fact that the fruit of the plant does not accord with that of either *Actæa* or *Cimicifuga*, proposed the name "*Macrotys actæoides*," changing the name in 1828 to "*Botrophia serpentaria*." Subsequently Eton, in the fourth edition of his Man-

ual, followed Rafinesque, calling the plant *Macrotys serpentaria*.—Meyer Bros. Drugg., June, 1911, 167.

Cimicifuga—Chemical Examination.—H. Finnemore has made a systematic chemical examination of the rhizome of *Cimicifuga racemosa*, resulting in the isolation and identification of the following constituents: *Isoferulic acid*, to which he assigns the constitutional formula $C_8H_6O(COOH)(OCH_3)$, and from which he prepared the acetyl derivative, having the composition $C_8H_5(OAc)(COOH)$. The melting point (146° C.) and other properties of this derivative agree with those of *Hydroisoferulic acid*. A small quantity of *Salicylic acid*. A trace of substance having the melting point 152° C. *Palmitic acid*. A *Phytosterol*. Three crystalline bodies, apparently *Alcohols*, one of which has the empirical formula $C_{14}H_{22}O_4$, the other two being represented by the formula $C_{15}H_{22}O_4$. Tests for *Alkaloids* gave evidence of their presence in very small amount—too small, however, to justify further research.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1910, 435–444.

Hydrastis—Historical Notes.—Prof. John Uri Lloyd says that the first printed account of hydrastis came from a paper read by Mr. Hugh Martin before the American Philosophical Society, 1782, published in the Society's Transactions, 1783, under the title "An Account of Some of the Principal Dyes employed by the North American Indians." Hydrastis canadensis is native to North America. Once abundant in the thick woodlands of the Central West, in the territory bordering the Ohio River from Illinois to Virginia, it is now practically exterminated in its native home. The root, of a rich golden-yellow, is known by the common names, golden seal, yellow puccoon, yellow root, and other similarly expressive appellations signifying its color or applying to its nature. The therapeutic qualities of this drug were first brought to the notice of the medical profession by Barton, 1798, who credits the Cherokee Indians for its ascribed uses; and subsequently it is favorably mentioned as a remedial agent for outward application, as infusion, etc., by a number of conspicuous authorities: Hand (1820), Elisha Smith, (1830), Kost, (1851), Dunglinson, (1852)—the latter, however, stating that it is only used in Kentucky, and then only as an outward application for wounds.—Drugg. Circ., May, 1911, 245.

Pœonia Arborea—Constituents of the Root.—According to the recent studies of M. G. Péron, the "pæonol" described by Martin and Jagi as a constituent of the root of *Pœonia arborea* does not pre-exist in the root as such, but must be regarded as a product of the hydrolysis of a pre-existing glucoside by the action of a specific enzyme, glucose being split off at the same time.—Pharm. Ztg. lvi (1911), No. 21, 211; from Journ. de Pharm. et Chim., 1911, No. 5.

Pœonia Moutan—Glucosidal Constituent of the Root.—According to G. Péron the root of the tree peony, *Pœonia moutan*, contains a glucoside

which is hydrolized by boiling with dilute mineral acids, and also by a specific enzyme which accompanies it in the root, but not by the action of invertin or of emulsin. The hydrolysis products are pæonol and a dextrorotatory sugar. Pæonol does not exist in the free state in the root.—Pharm. Journ. and Pharmacist, Feb. 25, 1911, 249; from Journ. de Pharm. et Chim., 1911, *3*, 93.

BERBERIDACEÆ.

Podophyllum Emodi—Superiority of the Yield and Activity of the Resin.—Referring to his researches on the resin of *Podophyllum Emodi* communicated in 1892 (see Proceedings 1903, 630), John C. Umney contributed some further notes at the 1911 meeting of the British Pharmaceutical Conference, in which he records the results of recent examinations of rhizomes collected, in accordance with his suggestion, under different conditions and at different seasons. The present investigation is more than ever convincing that it is upon natural variations in the resin, most probably at different seasons of the year, that the varying results (recorded by different workers) have been obtained. All workers are agreed that the proportion of resin in the Indian variety (*P. emodi*) is on an average twice that of the American (*P. peltatum*); but in judging of the relative value and composition of the resins obtained by different workers, it is not easy to arrive at conclusions because of differences in processes and nomenclature. It would certainly appear, however, that "picropodophyllin" is not an actual constituent of the drug, but is formed by decomposition of "podophyllotoxin" which, together with "podophyllo-resin," an indefinite amorphous substance, represents the activity of the drug. The distinction of the two varieties of the drug is, however, not confined to the greater yield of resin from the Indian drug, but in that the resin from the present Indian material (collected after fruiting in 1910) contains twice as much podophyllotoxin as the resin from India rhizomes examined in 1892, or that obtained from the American (*P. peltatum*)—the actual figures obtained being: Indian, 1892, 25.0 per cent.; Indian, after fruiting, 50.3 per cent.; American (*P. peltatum*), 22.9 per cent. The difference in the two Indian varieties, the author conjectures, is due to the period of collection, the rhizome of *P. emodi* collected after flowering being much richer in podophyllotoxin and consequently of greater activity than the rhizome of 1892, the collection period of which is not known.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy) 1911, 388–391.

Podophyllum Emodi—Percentage of Resin in Rhizomes.—Quoting from the annual report of 1910–1911 of the Industrial Section of the Indian Museum, David Hooper says that three samples of the rhizomes of Indian podophyllum, grown in Hazara, in the Punjab, and in Kashmir, were examined for resinoid for a firm of local wholesale druggists. Previously

recorded results gave 10 and 12 per cent. of resin, except a sample of Kashmir rhizomes, which gave in 1898–99 as much as 14 per cent. of active resin. The present samples have enabled the high value of the cultivated Kashmir rhizomes to be confirmed. The three samples yielded :

	Hazara.	Kashmir. Shade-dried.	Kashmir. Sun-dried.
Resin	11.7	13.9	13.7
Moisture	9.1	8.7	8.7
Ash	4.4	4.7	4.1

Pharm. Journ. and Pharmacist, Sept., 1911, 250.

MENISPERMACEÆ.

Pareira—Alkaloidal Constituents.—In previous researches, M. Scholtz has demonstrated that a brown, amorphous alkaloidal mixture is obtainable by extraction of the root of *Chondondendron tomentosum* (pareira root) with diluted sulphuric acid and precipitation with soda solution, which correspond in the general character with commercial "bebeerine," and that this alkaloid mixture consists in the amount of 10 per cent. of pure bebeerine ; also, that by extraction with ether, this is obtained as an amorphous, nearly white powder, which by crystallization from methyl alcohol yields the pure bebeerine ($C_{18}H_{21}O_3N$). The author has now succeeded in isolating from this residual alkaloidal mixture, composing the bulk of the original product, a second alkaloid, which he has named

Chondrodin.—This is a yellowish amorphous product, soluble in hydrochloric acid and in soda solution, sparingly soluble in alcohol, and insoluble in ether, acetone and chloroform. The author has determined the constitutional formula of the new alkaloid, which on comparison with that of bebeerine ($C_{16}H_{14}O(OH)O.CH_3(N.CH_3)$), makes it apparent that chondrodin may be regarded as bebeerine, in which one atom of hydrogen is replaced by a hydroxyl. The close relationship of the two alkaloids, apart from their occurrence in the same plant, is also evidenced by their behavior to many reagents. Both are extremely sensitive to oxidizing agents, and in particular to nitric acid, which acts upon them even in very dilute solution and produces brown flocculent precipitates of an acid nature. The author has prepared a number of salts and esters of chondrodin, describes their character, and gives their chemical formula, which for the alkaloid is $C_{18}H_{21}O_4N$, and therefore that of an oxybebeerine.—Arch. d. Pharm., *249* (1911), No. 6, 408–418.

RUTACEÆ.

Buchu—A New Adulterant.—E. M. Holmes directs attention to a new adulterant of buchu leaves, which differed from the genuine leaves of *Barosma betulina* on superficial examination in having a bitter taste,

freedom from odor, and in being more or less covered with black dots. They were oblique or unequal-sided and showed by the base of the leaflet evidence of being trifoliate leaflets, of which the central one is nearly equal-sided, whereas all buchu leaves are simple. The twigs and the base of the leaflets, and the veins and edges of the leaflets were hairy, and the surface appeared rougher than buchu, due partly to the prominence of the veins, and of the more numerous oil glands. The edge of the leaf is not serrate but minutely dentate. One characteristic feature is that the leaflet has a minute recurved apiculus. The presence of stipules on the leaf-stalks showed that the leaflets could not belong to the Rutaceæ, which is not a stipulate order. On showing the leaflet to Mr. N. E. Brown, at Kew, he at once noticed the peculiar features of the recurved apiculus as a characteristic feature of the leguminous genus *Psoralea*. In going through the African species of that genus, Mr. Holmes found that the leaflets agreed well with those of *Psoralea obliqua*, E. Mey., a small shrubby plant, 2 to 4 feet high, common near Stellenbosch—about 25 miles east of Cape Town, and therefore in the district where *B. betulina* grows—the Paarl, and Dutoitskloof. The best characters to look for are the curious recurved apiculus, the unequal-sided lamina, the more numerous usually dark oil-glands, and the hairy surface. The bulbous bases of the singular elongated epithelial cells of the oil glands and their small polygonal terminal surfaces which are characteristic of the *Psoraleæ*, if noticed in the powder would form characteristic features.—Pharm. Journ. and Pharmacist, July 16, 1910, 69.

Adulterated Buchu—Appearance on the London Market.—The appearance of buchu leaves from the Cape, consisting partly of a leaf similar in outward appearance and characteristics to the official round buchu, but proving on closer examination be an entirely different leaf, leads the "Chemist and Druggist" to give some interesting information concerning this sophisticated article. These unofficial leaves are easily detected by their shape (as shown in drawings accompanying the original) their coarser texture, aud their having bases and margins. They are spotted with numerous brown dots, which are seen to correspond with pellucid oil-glands when a leaf is held up to the light. Although containing numerous oil-glands, the substitute does not possess as powerful an odor, nor are the leaves as pungent to the palate, as the less glandular official variety. The portions of stem accompanying the mixed leaves are also of two kinds—the slender green or purplish ones of the official buchu, which are glabrous and channeled, and also dark brown or dark grey twigs covered with numerous short hairs derived from the substitute. The latter bear the alternate stipulate petioles (⅛ inch long) of the stalked trifoliate leaves, so that the adulterant consists of leaflets. The stipules are of a brownish color, with glands and longitudinal veins. The leaflets are very variable in shape, being from obovate to oblanceolate, averaging from ½ inch to

¾ inch in length. The latter leaflets are frequently asymmetrical. The margins of the leaflets are irregularly and obscurely toothed and often inrolled, while the apex is recurved and prolonged into a downward pointing apiculus. The leaflets, especially younger ones, bear silky hairs along the midrib and lateral veins, and also scattered along the margins. In the older leaflets they tend to fall off, but can still be found at the base of the midrib. The oil-glands, as stated above, are very numerous. The microscope, however, reveals the greatest differences between the two buchus.—Chem. and Drugg., July 2, 1910, 49.

False Buchu—Additional Notes Concerning its Botanical Source.—The false buchu which has recently been identified as being derived from a species of *Psoralea*, by E. M. Holmes as probably *Psoralea obliqua*, E. Mey, and by Dr. W. Froembling, as *P. bracteata*, L., has since been examined by N. S. Pillans, of the Agricultural Research Branch, Department of Agriculture, who finds that the false drug apparently consists of the leaflets of *P. polysticta*, Benth, but that in the absence of flowers he would not care to definitely name the species. It is evident from these divergent opinions that the exact identity of these leguminous leaflets is a matter of some difficulty. In his interesting note, Mr. Pillans agrees with the importer who attributed the presence of *Psoralea* leaflets to the ignorance of the native collectors, the latter being misled by their appearance and odor.—Chem. & Drug., Oct. 1, 1910, 49–50.

Buchu—Recent Substitutes.—The "Chemist and Druggist" calls attention to a parcel of false buchu, apparently possessing new characters, which was included in a lot of buchu which was received from the Cape recently. In appearance it resembles *Barosma crenulata*, L., but the leaves are, on the whole, larger in size (attaining ⅞ in. in length and ½ in. in width) and are greener in color, while the serrations are even less conspicuous than they usually are in *B. crenulata*, being in some leaves practically absent. The new leaf also agrees with *B. crenulata* in corresponding in odor and taste with the official buchu. On comparison with herbarium material it becomes apparent that the new buchu is simply a form of the above-mentioned variable species, *B. crenulata*, with oblong sub-sessile leaves and margins less markedly serrate than in the leaves usually met with in commerce. Leaves of *B. betulina* and *B. serratifolia* were also present in the parcel.—Chem. & Drugg., Oct. 1, 1910, 49.

Barosma Venusta—The Source of a New Variety of Buchu.—The "Chemist and Druggist" editorially directs attention to a new variety of buchu exhibited, though not offered for sale, by a Mincing Lane broker, which appears to be identical with the leaves derived from *Barosma venusta*, though in the absence of flowers the exact botanical origin cannot be stated. *B. venusta* is a shrubby plant, attains over a foot in height, and bearing crowded rod-like branches with slender leafy twigs. The

imported specimen consists of branches about 15 inches long, the upper portion of which is illustrated, as also the leaves. The upper leaves are broadly ovate or roundish, being $\frac{1}{5}$ to $\frac{1}{3}$ inch long and almost as broad. The lower ones may attain $\frac{1}{2}$ inch in length and are narrower. The leaves are erect and shortly stalked, bearing impressed marginal glands and smaller glands dotted throughout the soft tissues. The plant is distinguished from that of *B. pulchella* by the rounded shape of the leaves and the absence of a citronella odor. On crushing the leaves between the fingers the odor is at first pungent and acrid, but later recalls that of anise and fenugreek. Mr. N. S. Pillans, of the Cape Board of Agriculture, is investigating the South African buchus, and the diversity of the unofficial varieties which reach England shows the magnitude of the task he has undertaken.—Chem. & Drug., June 10, 1911, 50.

Barosma Crenulata, L.—Yield and Properties of Volatile Oils.—From the leaves of *Barosma crenulata*, L., Schimmel & Co. obtained 1.7 per cent. of volatile oil, possessing the following properties: $d_{15°}$ 0.9364, a_D—15°22′, $n_{D20°}$ 1,48005, soluble in 2.5 vols. and more 70 per cent. alcohol, with elimination of paraffin. The original oil was colored green by copper, but after removal of the metal it was brownish yellow. The odor was mint-like (menthone?), the diosphenol content was exceedingly slight, and when the sample was placed in a freezing mixture only paraffin separated out.—Schimmel's Rep., Oct., 1911, 23.

Buchu—Microscopic Recognition of Stems in the Powdered Drug.—Speaking in a general way of the accidental or intentional admixture of undesirable portions of the plant with the official part of the same, as for example of stems with cloves, belladonna, and spices, of seeds with colocynth pulp, etc., William Mansfield discusses in particular the increasing quantity of stems found in recent years in admixture with buchu leaves. Formerly the leaves were collected and sent to market with only traces of the stems present. To-day it is difficult to purchase buchu which does not contain stems in amounts varying from 5 to 50 per cent. Such buchu, of course, does not conform to the official requirement, yet buchu adulterated with stems is imported and sold as an every-day matter. It has been argued that the official standards must be changed to meet the trade conditions; but this is a reprehensible procedure and liable to be carried too far. Buchu containing a limited amount of stems will doubtless be allowed in the next Pharmacopœia; whether or not it is desirable that the structure of the powdered leaves and stems be understood by those who may be called upon to differentiate between, or identify them. With this in mind the author has prepared elaborate charts, exhibiting the microscopic elements of powdered buchu stems, which should enable any microscopist to make the necessary identification and differentiation.—Drug. Circ., May, 1911, 240–243.

Casimiroa Edulis—Constituents of the Seeds.—Under the title of "Lapote blanco" the Mexican Pharmacopœia recognizes both the fruit and seed of *Casimiroa edulis*, a tree widely distributed throughout Mexico and Central America. The fruit is edible, but the seeds have been stated to be deleterious and even poisonous, and although the subject of chemical investigation, and reputed to contain both an alkaloid and glucoside, no definitely characterized substance has hitherto been isolated from them. Frederick B. Power and Thomas Gallan have now made a complete chemical investigation of these seeds in the Wellcome Chemical Research Laboratories, and report the results obtained with 37 kilograms of the kernels. This material was first completely extracted with hot alcohol, the greater portion of the alcohol then removed, and the resulting thick extract distilled in a current of steam. A small amount of a pale yellow essential oil was thus obtained, which possessed an agreeable aromatic odor. It had the following constants: $d = 0.9574$ at 20°; a_D — 2° 25′ in a 25-Mm. tube.

From the portion of the extract which was soluble in water there were isolated (1) A new alkaloid, *casimiroine*, $C_{24}H_{20}O_8N_2$ (m.-p. 196-197°), of which the *aurichloride* and *picrate* were prepared. This alkaloid, on heating with alkalies, undergoes hydrolysis with the elimination of carbon dioxide, yielding a new base, *casimiroitine*, $C_{23}H_{22}O_7N_2$ (m.-p. 171), in accordance with the following equation: $C_{24}H_{24}O_8N_2 + H_2O = C_{26}H_{22}O_7N_2 + CO_2$ (2) A new alkaloid, *casimiroedine*, $C_{17}H_{24}O_5N_2$ (m.-p. 222-223°), of which the *aurichloride* was prepared; (3) benzoic acid, with a trace of salicylic acid. The aqueous liquid contained, furthermore, a quantity of sugar, which yielded *d*-phenylglucosazone (m.-p. 205°).

The portion of the extract which was insoluble in water consisted of a soft, oily resin, from which the following compounds were obtained:— (i) Sitosterol, $C_{27}H_{46}O$; (ii) ipuranol, $C_{23}H_{38}O_2(OH)_2$; (iii) a mixture of fatty acids, consisting of palmitic, stearic, oleic, linoleic, and linolenic acids; (iv) a new lactone, *casimirolid* $C_{24}H_{28}O_6$ (m.-p. 229–230°), which yield a new hydroxy-acid, designated as *casimiroic acid*, $C_{23}H_{28}O_4(OH).CO_2H$ (m.p. 207°). From this acid there were prepared the *silver* and *copper salts*, *methyl ester* and *acetyl derivative;* (v) a yellow, phenolic *substance*, $C_{16}H_{12}O_6$ (m.-p. 215–218°), which also appears to be a new compound. Physiological experiments conducted by Drs. Dale and Laidlaw failed to reveal any specific action of this material or any of the products described.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 623.

Fagara Xanthoxyloides—Constituents of the Fruit and Root-bark.— Prof. Thoms reports the isolation of a poisonous oil from the root-bark of *Fagara xanthoxyloides* from which a crystalline body separates on standing. This bears some analogy to cubebin and has been named "fagarol." The rind of the fruit yielded a volatile oil and a crystalline body. The latter

proved to be a powerful fish-poison and has been named "xantotoxin."—Pharm. Ztg., lv (1910), No. 92, 931.

Fagara Xanthoxyloides, Lam.—Characters of Volatile Oils, etc.—In a lecture recently delivered before the German Pharmaceutical Society, Professor Thoms reported on the root-oil of *Fagara xanthoxyloides*, Lam., (*Xanthoxylum senegalense*, D. C.). This oil contained, besides dipentene, linalool and cadinene (?), a lactone which he has named

Xanthotoxin. It has the formula $C_{12}H_8O_4$ (m. p. 144° to 145°), but its constitution is as yet unknown. It contains a methoxyl group and yields a nitro derivative and a bromide. When it is split up coumarinic acid is formed. Thoms states that the body bears some resemblance to citroptene, a compound which is also derived from Rutacea, but citroptene has two methoxyl groups and possesses a different elemental structure. Xanthotoxin is a fish-poison. When 5 Mg. of it, dissolved in 0.5 Cc. alcohol, were added to water containing a fish weighing 0.6 K., the fish immediately became semi-unconscious, then began to swim on its back, and died after 2 hours. The bark of the root as well as the fruit are used medicinally by the natives of Togo.—Schimmel's Rep., April, 1911, 73; from Chem. Ztg., *34* (1910), 1279.

Oil of Fagara Xanthoxyloides—Constituents.—Since the publication of the preceding paper of Prof. Thoms, H. Priess has published some detailed particulars concerning the examination of the root-bark and fruit of *Fagara xanthoxyloides*, from which the following concerning the constituents of the volatile oil is interesting: The peel contains about 2.5 per cent. essential oil of a brownish color and a faintly acid reaction ($d_{15°}$ 0.9229; $[a]_{D15°}$ — 1.20°; acid v. 2.19; ester v. 58.51), from which, with sodium bisulphite, methyl-n-nonylketone was isolated. For the purpose of identifying the ketone the author prepared the oxime (m. p. 45 to 46°) and the semicarbazone (m. p. 120 to 121°). It is probable that the ketone is mixed with an aldehyde, perhaps "decylic aldehyde." Oxidation of the ketone-fraction resulted in the production of n-caprinic acid.—Treatment of the oil with potash liquor led to the isolation of the lactone —*xanthotoxin*, a body melting between 143 and 144°. This compound may be obtained in considerable proportions by extracting the peel with alcohol. The nitro compound of xanthotoxin ($C_{12}H_7O_4NO_2$) melts at 230°, the dibromo compound, recrystallized from xylene, at 164°. When an alcoholic solution of xanthotoxin is diluted with potash liquor a salt, soluble in water, is formed, a yellow color ensuing. Of acids, the oil contained n-caprinic acid, both in the free state and in combination (m. p. of the amide 98°). The saponification liquor furthermore contained acetic acid, as well as a solid acid which was not examined more closely. Other constituents of which the presence was proven were: dipentene, linalool, and a sesquiterpene having the following constants—b. p., 170° to 180°

(14 Mm.); sp. gr. at 14°, 0.914; $a_D + 4°16'$.—Schimmel's, Rep. Oct., 1911, 49; from Ber. d. deutsch. pharm. Ger., *24* (1911), 227.

Pelea Madagascarica (?).—*Volatile Oil from the Fruit.*—Schimmel & Co. have distilled a few grams of volatile oil from a small quantity of fruit received from Prof. Heckel and described as being probably derived from *Pelea Madagascarica*, Baill., the yield being about 4.05 per cent. While the fruit had a moderately strong odor of anise, that of the oil reminds less of anethol than of anisic alhehyde. This view was confirmed on further examination, for even when the oil was placed in a freezing mixture and inoculated with an anethol-crystal only a very little solid anethol was separated, whereas the oil reacted strongly with sodium bisulphite. Apparently the principal body which was liberated from the bisulphite-compound was anisic aldehyde, but it is not impossible that other aldehydes may also be present. The sample was too small for the direct determination of any constituent, only a few grams being available. The constants were as follows: $d_{15°}$ 0.9553, $a_D + 32° 22'$, $n_{20°}$ 1.51469, soluble in about 4 vols. and more 80 per cent. alcohol.—Schimmel's Rep., April, 1911, 123.

GERANIACEÆ.

Linseed—Percentage and Properties of Mucilage.—According to the investigations of H. A. D. Neville, linseed contains about 7 per cent. of mucilage, which, as obtained by swelling up the seeds in very dilute sulphuric acid and precipitation from the colloid solution obtained with much alcohol, is a slightly acid substance, having a percentage composition corresponding to a carbohydrate, and contains a small quantity of ash. Purification by repeated solution in water and precipitation by alcohol lowers the ash-content somewhat, but does not remove the acid property. On hydrolysis with diluted sulphuric acid, dextrose, galactose, arabinose, xylose, and small amounts of a cellulose-like substance and of an acid yielding a soluble barium salt, are formed; while on boiling with hydrochloric acid, furfurol is evolved in quantity corresponding to the presence in the mucilage of about 17 per cent. of pentosans. Malt extract, saliva, and pancreatic juice has no action on the mucilage.—Pharm. Journ. and Pharmacist, Oct. 26, 1911, 528; from Chem. Trade Journ., Sept. 16, 1911, 265.

STERCULIACEÆ.

Kola-Nuts—Simple Method of Estimating the Caffeine Content.—Desoignes recommends the following simple method for the estimation of caffeine in the kola-nuts: 15.0 Gm. of the finely powdered nuts and 10.0 Gm. of calcined magnesia are mixed, and gradually triturated with sufficient water to make a semi-fluid mass. This is allowed to dry completely at a temperature of 20°–25°, transferred to a separating funnel and after

thoroughly imbuing it with 30 Cc. of dry chloroform, allowed to stand 3 or 4 hours. The chloroform is then drawn off drop by drop, by opening the stop-cock sufficiently, into a tared vessel, and this treatment with chloroform, 20 Cc. at a time, is repeated until the drug is exhausted (determined by evaporating a drop of the chloroform extraction). The chloroform is then distilled off, and the residue, which consists of practically pure caffeine, is weighed.—Pharm. Ztg. lv (1910), No. 67, 676, from Journ. de Pharm. et Chem., vii (1910), 21.

TERNSTROEMIACEÆ.

Camellia Japonica—Constituents of the Seeds.—R. Ketamura Yakugahuzasshi, finds that when the seeds of *Camellia japonica*, previously freed from fat, are extracted with boiling alcohol, a crystalline glucoside, camellin, $C_{18}H_{32}O_7$, is separated; it melts at 181–184° C., and is readily soluble in alcohol, 80 per cent. When hydrolyzed it yields a syrupy substance and a sugar allied to rhamnose. It is accompanied in the alcoholic extract of the seeds by an amorphous substance which gives a yellow precipitate with basic lead acetate. The seeds contain no caffeine.—Pharm. Journ. and Pharmacist, Mar. 4, 1911, 297; from Journ. de Pharm. et Chim., 1911, *3*, 128.

Thea Sasanqua—Properties of the Volatile Oil from Young Leaves.—H. Kimutra describes the volatile oil from the young leaves of *Thea Sasanqua*, a tree growing in Japan, where it is used as an ornamental as well as economic plant. The oil was obtained by cutting the leaves very finely, macerating them in water for twenty-four hours, and distilling in a current of steam. From the milky distillate the oil was salted out and extracted with ether. The yield was from 0.4 to 1.0 per cent. The color of the oil varies from nearly brown to violet, the latter color evidently being brought about by oxidation by the air. It has a pleasant, sweetish odor, is optically inactive, and the specific gravity of the unpurified oil is $D_{21}=1.061$. Sasanqua oil contains about 97 per cent. of eugenol, and very small quantities of a ketone or aldehydic substance, the remainder consisting of a pleasant-smelling ester which on saponification yields an unpleasant-smelling acid, and an alcohol having an odor like rose oil. Pharm. Journ. and Pharmacist, April 22, 1911, 525; from Ber. d. Deut. Pharm. Ges., 1911, No. 3, 209.

VITACEÆ.

Wine—Bitter Taste Caused by a Microbe.—E. Voisenet finds that the bitter taste which sometimes develops in wines after alcoholic fermentation is completed, is caused by infection with a specific bacillus, which he has isolated and cultivated on Laurent's nutritive medium. This bacillus decomposes glycerin, with formation of acrolein, to which the unpleasant taste is due.—Pharm. Journ. and Pharmacist, Dec. 23, 1911, 849; from Compt. rend., *153* (1911), 363.

Wine Vinegars—Inositol a Characteristic Constituent—Mellière having shown in 1908 that inositol is a constant constituent of wines, P. Henry has since found that this sugar is not affected by the fermentation which converts wine into vinegar. It is therefore clear that the presence of inositol serves as evidence of the original source of these vinegars from grape juice, and to distinguish them from those derived from alcohol and other sources. To determine its presence 100 Cc. of the vinegar is evaporated almost to dryness on the water-bath to drive off the acetic acid. The residue is taken up with 50 Cc. of water, neutralized by sodium hydroxide and mixed with 3 Gms. of barium hydroxide; the precipitate formed is separated by centrifugation and washed with 20 or 30 Cc. of barium hydroxide solution. The bulked liquid is then freed from excess of barium, either by means of a current of carbon dioxide, or by sulphuric acid, added to neutrality; 10 Cc. of saturated solution of lead acetate is then added, and the precipitate formed is removed by centrifugation. The clear liquid thus obtained is made up to 100 Cc. and treated with 10 Cc. of basic lead acetate solution and 2 Gms. of cadmium nitrate dissolved in water. The bulky precipitate which results carries down the inositol. It is collected and decomposed with sulphuretted hydrogen. The filtrate, after removing the lead sulphide, is evaporated to a syrup, treated with 20 Cc. of absolute alcohol, and 5 Cc. of anhydrous ether is added to precipitate the inositol. After standing for twenty four to forty-eight hours, the precipitate is collected and identified as inositol by the usual reactions. All the genuine wine vinegars examined by this method afforded the characteristic reactions.—Pharm. Journ. and Pharmacist, Nov. 5, 1910, 551; from Journ. de Pharm. et Chim., 1910, *2*, 264.

HIPPOCRATICEÆ.

Borneo Camphor—Cause of Sporadic Occurrence in the Same Plant.—It is well known that Borneo camphor occurs in a most erratic manner in the wood of *Dryobalanops aromatica*, a tree found on the northwest coast of Sumatra, in the northern part of Borneo, and in the small British island of Labuan. All observers are agreed that the camphor is found in comparatively few trees of this species, and the native collectors, in searching for it, are commonly guided by the appearance of the wood of the stem when freshly chopped, by a curious buzzing sound in the trunk of the tree, and to a less extent by the aroma of the freshly cut wood. The reason of this erratic occurrence of the material has until now been wrapped in mystery, but observations made recently by Dr. Janse at the suggestion of Professor Nieuwenhuis, of the Royal University of Leiden, have thrown some light upon the matter. The Dutch Resident at Baros forwarded to Professor Nieuwenhuis two series of samples of the wood of the Baros camphor tree, and in examining this material Dr. Janse found that the camphor always occurred in long radial fissures, but that although such fis-

sures were common in the wood they did not all contain camphor. In those which did contain camphor there were always openings by which the fissures were in communication with the atmosphere, and in addition the wood had acquired a darker brown color. In those cases in which no camphor was present in the fissures they contained Baros camphor oil. From these data Dr. Janse concludes that the formation of the camphor (diborneol) is due to the action of atmospheric oxygen on some constituent of the oil, and suggests that the openings into the fissures are tunnels made by a boring insect. In support of this it may be mentioned that in one case a fissure was found containing oil from which camphor had partially separated. No suggestion is offered as to the origin of the fissures or of the oil, but these observations explain in a satisfactory manner the rather erratic occurrence of the camphor, since it will only be found in those trees attacked by the boring insects, and incidentally they supply the reason for the importance attached by the native collectors to the buzzing sound in the stem which they regard as a sign of a "find," the sound being doubtless due to the activity of the beneficent insect.—Chem. & Drugg., Sept. 3, 1910, 64; from "Teysmannia," 1909, 37.

Borneo Dammars—Characters and Constants.—E. Gottlieb describes and gives the results of the chemical examination of two dammar resins from Central Borneo—the one, designated as *recent dammar*, probably derived from *Retinodendron Rassak* (*Vatica Rassak*, Bl.), which yields the so-called "Dammar Dagieng" or "Rose Dammar;" the other, *recent-fossil dammar*, derived from the same locality, which is dug up from the ground, and is much darker in color.

Recent-Borneo Dammar occurs in bright yellowish white pieces, a few having a reddish tinge, melting at 130° up to 150°. Alcohol dissolves about 82 per cent.; petroleum ether, 30 per cent.; carbon disulphide, 45 per cent.; benzol, 25 per cent.; chloroform 18 per cent.; acetone, 60 per cent.; methyl alcohol, 70 per cent.; amyl alcohol, 50 per cent.; and ether, or a mixture of equal parts of ether and alcohol, dissolves it completely with exception of impurities. It is almost insoluble in petroleum ether or in 80 per cent. solution of chloralhydrate. Its acid value (direct) is 140–142; sapon. val. (cold), 159.6–162.4; and it yields about 35 per cent of an acid, $C_{24}H_{44}O_4$, and 30 per cent. of another acid, $C_{13}H_{26}O_2$; 16 per cent. of resene, $C_{22}H_{28}O$; and 15 per cent. of volatile oil.

Recent-fossil Borneo Dammar occurs in much darker pieces than the preceding, but has the same upper and lower melting points (130° to 150°). It has the following solubilities: Alcohol 28 per cent.; acetone, 40 per cent.; benzol, 16 per cent.; oil of turpentine, 35 per cent.; chloroform, 15 per cent.; carbon disulphide, 18 per cent.; ether, 65 per cent.; petroleum ether, 4 per cent. It contains about 18 per cent. of an

acid, $C_{12}H_{18}O_2$; 25 per cent. of an acid, $C_{14}H_{32}O_2$; 18 per cent of an acid, $C_{16}H_{26}O_2$; 6 per cent. of resene; 8 per cent. of volatile oil; and 6 per cent. of a bassorin-like body.—Arch. d. Pharm. *249* (1911), No. 9, 701–710.

ERYTHROXYLACEÆ.

Coca—"The Divine Plant of the Incas."—Prof. John Uri Lloyd contributes an interesting historical account of the uses of the leaves of *Erythroxylon coca*, with particular reference to the discovery of its alkaloidal constituent and of the special pharmacological activity of the latter. The tree is a native to the eastern slopes of the Andes, where, especially in Bolivia, large plantations are cultivated. The leaves have been highly valued, from the earliest records, by the natives of Peru, Chili and Bolivia, by whom the tree was called "The Divine Plant of the Incas." Among the earliest references to the drug is the description of Monardes published in 1569 and reproduced (in translation) in 1577, followed by the botanical description of Clusius in 1605. Since then the history of coca, in its many phases, is exhaustively presented by several travelers and authors, one of the most interesting being a large illustrated work of nearly 600 pages by W. Golden Mortimer, M. D., under the title "Peru. History of Coca." Modernly, the persistent reports concerning the uses of coca and its reputed power as a medicament, led to an investigation of the chemical constituents of the drug, resulting in the discovery of several bases, among them *cocaine*, which was discovered by Niemann in 1860. But notwithstanding the identification half a century ago of its now well known alkaloid, coca was long thereafter "authoritatively" considered an inert, or simply a mild stimulant like tea. Its alleged properties were deemed legendary and imaginary, its alkaloid similar to caffeine both in constitution and qualities, until, in 1884, Koller confounded the professional world by announcing the marvelous qualities of cocaine as a local anesthetic. Professor Lloyd then follows up the investigation made since that period, concluding his account in the following expression: "No longer are the virtues of coca and its constituents viewed as merely legendary, or as poetic myths. No longer is the drug suppressed because of its past part as a factor in heathen religious rites. No longer are physicians who use it discredited by "right" and "authority." Out of the obscurities of the centuries lost to time when first coca appealed to primitive man; from out the subsequent centuries of ostracism and neglect after the New World's discovery, coca has taken, at last, its rightful place. It is a substance that, like Nature's other richest gifts, may be either a mighty curse, or a God-sent blessing to humanity."—Pract. Drugg., October, 1910, 90-93.

Erythroxylon Truxillense, Rusby—*Not Identical with E. Spruceanum.* Dr. H. H. Rusby having assumed that the small leaved Peruvian or Truxillo coca of commerce was the produce of the plant called by

Dr. Burk *Erythroxylon spruceanum*, had given the name E. Truxillense to this plant because the name *spruceanum* had previously been applied by Psyritisch to a different species. E. M. Holmes has now had opportunity to compare Dr. Rusby's plant with other species. He finds that in the *E. truxillense* of Rusby the leaves agree with those of *E. Coca* (*E. Bolivianum*, Burck) in having a ridge on the upper surface of the mid rib, the stamens exceed the styles in length, and, except in shape of leaves, it closely approaches *Bolivanum*, the mid-rib being reddish towards the base. In regard to the shape of ths leaves, it is nearer to *E. Nova-granatense*, and also in the fewer axillary flowers with longer pedicels, thus forming a link between the two plants. But it differs entirely from the *E. spruceanum* of Burck in the relative length of the styles and stamens, since in the latter the styles exceed the stamens in length. It is well, therefore, that Dr. Rusby's name, *E. truxillense*, should be retained for it, but it should not be regarded as identical with the *E. spruceanum* of Burck. It seems probable that the *E. spruceanum* of Burck is the long styled form of the plant of which Dr. Rusby's *E. truxillense* is the short-styled form. Of the Huanuco or Bolivian coca there appear also to be two forms—viz., the *E. coca* of Lamarck, which Hooker figures with short styles, and the *E. bolivanum* of Burck, which has long styles. Except in so far as these forms of the two plants may differ in habit of growth, or in the proportion of chemical constituents, it is hardly necessary that they should be held as distinct, or receive a definite name. The name *E. coca*, Lamarck, for the Bolivian drug, and that of *E. truxillense*, Rusby, for the Peruvian one will therefore answer all practical purposes.—Pharm. Journ. and Pharmacist, Dec. 17, 1910, 936.

Coca Leaves—Critical Review of Methods of Valuation.—E. Bierling, K. Pape, and A. Viehoever critically review all the well-known methods for the estimation of alkaloids in coca leaves, classifying them according to the manner in which the leaves are first extracted. In each case an outline of the method is given, and this is followed by an opinion as to its value. Many are quite worthless owing to the fact that the solvent is inappropriate, as for example, where the leaves are simply extracted with ether, which does not dissolve the cocaine occurring for the most part as salt in the leaves, or that decomposition takes place at certain stages from the effect of heat or alkali, or both. The methods of Lossen, Castaing, Gordon, Greshoff, Squibb (1885), Warden, Squibb (1889), Truphème, Albertini, and Guareschi, Bignon, Köhler, and Van der Marck are objected to on the ground that by heating the alkaloidal solutions cocaine is lost, while those of Pfeifer and of Lèger fail from insufficient purification, and Schmidt's and Schmidt-Gaze's methods estimate hygrine at the same time. Of the remaining methods, various objections are made to those of Squibb (1887), Lamar, Grandval-Lajoux, while those of Gunn and the United States Pharmacopœia are good, although the preliminary process

of percolation is considered somewhat tedious ; the latter objection is also made to de Jong's (1909). Those of Keller, Panchaud, de Jong (1905), Fromme, and the Swiss Pharmacopœia, are the simplest, but give high results through loss of ether in filtering.—Pharm. Journ. and Pharmacist, Aug. 13, 1910, 235 ; from Arch. d. Pharm., *248*, (1910), 303.

Coca—results of sixty assays made since 1903 are communicated by Henry J. Goeckel in a paper which appears in "Proceedings," 1910, 1051–1053.

SAPINDACEÆ.

Guarana—Method of Preparation, Constituents, etc.—P. H. Marsden gives some interesting information concerning the preparation of guarana, which, as is well known, is obtained from the seeds of *Paullinia sorbilis*, Mart. The name of the drug is derived from a tribe of Indians in the Amazon basin, and is pronounced with the accent on the last syllable, much like Panama. The plant which yields guarana is abundant in the province of Amazonas, along the banks of the Tapajos, Rio Negro, as well as in Guiana and Venezuela. The Guarani Indians prepare the guarana by first washing the seeds, which are then lightly heated to separate the kernel from the seed coat, complete separation being effected by beating the seeds contained in bags with sticks. They are then crushed upon a heated stone and made into a paste with water, to which is sometimes added cacao powder or manioc flour. This paste, moulded into cakes or cylinders, is then exposed to the sun or submitted for several weeks to a gentle heat. The alkaloid of guarana, which is identical with theine, occurs to the extent of 5.07 per cent. ; in tea, 2.13 per cent. ; in coffee, 0.80 per cent. ; in maté, or Paragua tea, 1.25 per cent. The amount of ash found in the substance has been variously stated to be from 1.30 to 2.00 per cent.—Pharm. Journ. and Pharmacist, Nov. 12, 1910, 577 ; from Ann. Trop. Med. and Parasit., *4*, No. 1, June, 1910, 105.

PAPAVERACEÆ.

Corydalis Cava.—Constituents of the Herb.—In continuation of his researches on the constituents of the plants belonging to the Papaveraceæ, J. Gadamer has determined the presence of *protopine* in the herb of *Corydalis cava*. Besides this base, he isolated "*glaucine*" (a base which heretofore has been found only in *Glaucinum luteum*), and two other bases having a non-phenolic character—the one, the so-called *Haars' base* ($C_{21}H_{23}NO_7$) ; the other, an uncrystallized base, or a mixture of such. Several bases having phenolic characters are also described.—Arch. d. Pharm., *249* (1911), No. 3, 224–233.

Papaver Somniferum—Development of Alkaloids.—An examination of plants of *Papaver somniferum* at different periods of growth, by M. G. Kerbosch, has demonstrated that narcotine is the first akaloid to be formed ;

then codeine, morphine, papaverine, narceine, and thebaine. The seeds contain only traces of narcotine and amorphous alkaloid; notable quantities of narcotine are formed during the first three days' growth. When the plants are 5 to 7 Cms. high they contain codeine, morphine and papaverine as well; these four alkaloids are found in all organs of the flowering plant, and even in the stamens. In the mature plant papaverine disappears, and only narcotine, morphine and codeine remain. Seeds grown in nitrogen-free soil still form narcotine. The base is therefore probably derived from the albuminoids contained in the seeds.—Archiv. d. Pharm., *248* (1910), No. 536.

Papaver Orientale and P. Lateritium — Alkaloidal Constituents.—A preliminary examination, by J. Gadamer, of the alkaloids contained in the entire plants of *Papaver orientale* and *P. lateritium* showed that very little, if any, protopine was present, the alkaloids in both cases being almost entirely phenolic in nature. *P. orientale* was found to contain two alkaloids, the principal one of which crystallized from ether in good colorless crystals of melting-point 204–205° C.; this gave no color with strong sulphuric acid or Erdmann's reagent, but gave strong colors with some other alkaloidal reagents. The alkaloidal constituents of *P. lateritium* appeared to be a mixture, and attempts at crystallization were not successful; the color reactions with various substances were quite different from those given by the alkaloid of *P. orientale*.—Arch. d. Pharm., *249* (1911), No. 1, 39.

Opium—Culture-Experiments in Austria.—Dr. W. Witlacker and R. Wasicky give some interesting information concerning culture-experiments undertaken in Austria during recent years with the object of cheapening the method of collecting the opium from the poppy. It has been demonstrated by numerous experiments recorded during the past century that the poppy (*Papaver somniferum*, L.) cultivated throughout Central Europe, will yield by the oriental method of collection (by incisions in the unripe capsules) opium differing very little or not at all from Smyrna opium of normal quality in its alkaloid content. The cultivation of the poppy for the production of opium has, however, been prohibitive on account of the high cost of the labor required for collecting the poppy juice by incisions on the capsules of the young plant. The authors therefore conceived that a method of expression might lead to the economical production of opium of satisfactory quality; but in this they were disappointed. Opium obtained in this way was extremely deficient in alkaloid, containing only about 5 per cent. of the quantity of morphine found in opium prepared from the same crop by the oriental method; nor was it possible to obtain more than 20 per cent. of the morphine content of the latter, by repeated extraction of the marc remaining after the expression of the juice. Nevertheless, the author believes that by improving the method of expression, using a press of greater power, possibly in connection with an

inflow of warm water, it may be practicable to prepare an opium with a profitable content of alkaloid, though admitting that at present the proposed method has no practical value.—Pharm. Ztg., lvi (1911), No. 13, 128; from Unters. d. Allg. Oesterr. Apoth.-Ver., 1911, No. 5.

Russian Opium—Morphine Content of a Sample Cultivated at Dorpat.—J. J. Muschinsky observes that although the poppy is cultivated as an oil-producing plant in the southern and western governments of Russia, experiments to obtain opium have practically been neglected, while the few endeavors that have been made (in Turkestan and Transcaucasia) resulted in the production of inferior opium, as was shown in the Russian exhibit at Vienna in 1873. The author says that in the summer of 1910 two kinds of poppy were grown from seed in the Dorpat Botanical Garden, the one from the seeds of *Papaver somnifer*, L. var. *Glabrum*, Boiss, the other from the seeds of the poppy commonly cultivated for its oil. Owing to unfavorable weather conditions, the experiments with the former failed; but they proved very satisfactory with the common poppy, the weather conditions being favorable during the collection of the opium, in the usual manner, by incisions. The darkened and thickened exudation when scraped into a glass dish and dried at a moderate temperature, amounted to 7.5 Gm. and had the characteristic odor, taste and color—the latter perhaps a little lighter—of commercial opium. When dried at 100° C., this opium lost 11.4 per cent. of moisture, and assayed by Dietrich's method 12.2 per cent. of morphine.—Pharm. Ztg., lvi (1911), No. 60, 604; from Farmaz. Journ. russ., 1911, 246.

Opium—Advantageous Method of Sampling for Assay.—L. H. Bernegau has with advantage adopted the following method for selecting and preparing the sample of a shipment of opium: A sufficient number of balls are selected—size and hardness being considered in making it representative. A special sector is cut from each ball, and the sample thus obtained is crudely mixed by kneading or by pounding in a mortar. Then it is run through an ordinary meat chopper or grinder, the latter manipulation being repeated three or four times. The result is a perfectly homogeneous mass, free from lumps, and duplicate assays will run extremely close, whereas, after the old method of mixing, a considerable variation in duplicates often resulted.—Proc. Pa. Pharm. Assoc., 1911, 309.

Opium—Difficulty of Desiccation for Morphine Estimations.—Mme. Marcelet and H. Marcelet point out an anomaly in the French Pharmacopœial process of estimating morphine in the crude opium and in the powdered substance where the desiccation is effected at 60° and 40° respectively. In making practical observations they were surprised to find how slowly the water evaporated from the opium at the temperature of 60° indicated by the French Pharmacopœia. The summary of the results shows that the greater part of the water evaporates in the first

twelve hours; after sixty hours the loss of weight is very small; finally, the weight only becomes constant after 122 hours.—Pharm. Journ. and Pharmacist, Oct. 22, 1910, 492; from Bull. de Sci. Pharmacolog., Aug., 1910, 446.

Opium—Microchemical Tests for Raw and Smoking Opium.—Prof. Albert Schneider describes a microchemical test for the examination of smoking opium, raw opium, and the preparations of opium whereby it becomes possible to identify the Chinese smoking opium, and all kinds of commercial opiums; to determine approximately the amount of total alkaloids in them, and to determine the presence of opium in pharmaceutical preparations, such as tinctures, fluidextracts, cough medicines, pills, tablets, lozenges, etc. The methods are explained in detail and must be consulted in the original paper, which cannot be profitably condensed. The paper is illustrated by a number of cuts showing the peculiarities of the crystalline forms as they appear under the microscope, according to the source or method of treatment to which the opium has been subjected for its intended use.—Merck's Rep., Sept., 1910, 245–247.

Opium.—Results of eighty-one assays by the process of the U. S. P. are communicated by Henry J. Goeckel in a paper which appears in "Proceedings," 1910, 1050–1051.

Poppy Seed—Hyoscyamus Seeds an Impurity.—A. v. Degen calls attention to the occasional presence of hyoscyamus seed as an impurity in poppy seed—in one case as much as 1.7 per cent. The presence of these poisonous seeds is most likely accidental, and is derived from hyoscyamus plants which frequently occur in profusion as a weed in the poppy fields. —Pharm. Ztg., lv (1910), No. 75, 758; from Ztschr. f. Unters. d. Nahr-u. Gessussm., 1910, No. 12, 705.

CRUCIFERÆ.

Red Radishes—The Coloring Matter as a Sensitive Indicator.—J. F. Sacher finds that a coloring matter can be extracted from fresh radishes which is an extremely sensitive indicator in acidimetry and alkilimetry. The coloring matter is decomposed by heat—probably from oxidation—and the radishes must therefore not be dried; it is not extracted by cold water, but may be obtained by macerating the roots for a few hours with an equal weight of alcohol of 96 per cent. The solution so obtained is usually neutral, but is sometimes slightly acid, and it must then be neutralized with $\frac{N}{100}$ alkali; the alcoholic solution may be used as an indicator, about 2 Cc. being employed as it is very dilute. The colors given are red with acid (more intense than the red of methyl orange) and green with alkali, or blue in a strong solution of the color. When 2 Cc. of the solution were added to 50 Cc. of distilled water, and another 2 Cc. to 50 Cc. of a natural water of alkalinity equal to 15 parts of $CaCO_3$ per 100,000,

red and green colors were produced respectively, whereas neither methyl orange nor phenolphthalein showed any difference between them. The indicator is particularly recommended for use when titrating acid into alkali; like litmus and phenolphthalein, it is sensitive to carbonic acid.—Pharm. Journ. and Pharmacist, Jan. 28, 1911, 97; from Chem. Ztg., Nov. 10, 1910, 1192.

CARYOPHYLLACEÆ.

Agrostemma Githago — A New Saponin from the Seeds.—J. Brandl, Mayr and Vierling have isolated from the seeds of *Agrostemma githago* a new saponin which he has named

Agrostemmic Acid. It was obtained from the crude saponin extracted by Roberts' process, and was separated from associated "agrostemma sapotoxin" by precipitation with basic lead acetate. The crude saponin of the seeds contains from 6 to 7 per cent. of the new acid. It is as poisonous as agrostemma-sapotoxin, but does not act so rapidly. When fused with caustic potash, it forms the same acid of high molecular weight as is obtained, under similar conditions, from agrostemma-sapogenin. Pigs and calves react readily to the sapotoxin. If healthy, they appear to acquire a certain immunity to it, but if unhealthy, they are very susceptible to its poisonous properties. Consequently, corn products employed for feeding these animals, when known to be contaminated with corn-cockle seeds, should be used with the greatest care and the stock circumspectly watched for any sign of digestive trouble. When the animals are not well, a small dose of agrostemma-sapotoxin may have a rapidly fatal action.—Apoth. Ztg., xxv (1910), No. 54, 500.

SAXIFRAGACEÆ.

Hydrangea Hortensia, var. Otakusa.—Constituents of the Flowers.—Y. Asahina has isolated two crystalline substances—*Hydrangenol* and *Hydrangeaic Acid*—from the alcoholic extract of the flowers of *Hydrangea Hortensia*, var. *Utakusa*. In the crude condition, *Hydrangenol* occurs in yellowish crystals melting at about 178° C., but when purified by recrystallization it forms white shining odorless and tasteless plates, melting at 181 to 182° C. The crystals are very soluble in alkalies and dissolve in sulphuric acid without color. The alcoholic solution is optically inactive. It gives a fine wine-red color reaction with ferric chloride. It is obtained by shaking out with ether an aqueous alkaline solution of alcoholic extractive. *Hydrangeaic acid* forms yellowish glittering scales melting also at 182°. Its alcoholic solution gives a violet color with ferric chloride. It is obtained by acidifying the alkaline solution after removing the hydrangenol by ether, and is purified by recrystallization from dilute alcohol.—Pharm. Zentralh., lii (1911), No. 31, 820–821.

CACTACEÆ.

Avocado Pear—Constituents.—The edible part of the "avocado pear" is described by J. S. Jamison as "a sweetish substance with semi-solid consistence, and largely used (in South Africa ? Rep.) as a condiment." Analysis was made on the original fruit, and afterward on the fruit dried at 100° C., the original sample showing the following composition: Ether extract, 19.63 per cent.; wood fiber, 4.94 per cent.; sugar, 1.08 per cent.; protein, 5.71 per cent.; ash, 2.04 per cent.; water, 66.92 per cent. The ether extract was a greenish-yellow liquid containing about 4 per cent. of resinous matter which was dissolved by alcohol, leaving the oil in a pure state. This oil had the appearance of oil of bergamot and showed the following constants: Koettendorfer value, 0.207; iodine value, 29.90; Zeiss's butyrometer, 65 at 20° C.; oleofractometer, +4. The composition of the American variety belonging to the same species, as given by Dr. Wiley in "Foods and Adulterations," seems very different from this Natal species. —Chem. News, Aug. 5, 1910, 61.

Cactina and Cactin—Influence on Blood Pressure.—E. P. Lyons and Guy L. Qualls report a series of experiments and observations on the influence of cactina and cactin on animals and on the pulse-rate and blood pressure in man. No effects were discoverable from the use of either of these substances.—Amer. Jour. Phar., Oct., 1910, 482; from Jour. Amer. Med. Assoc., *55* (1910), 455-459.

GROSSULARIACEÆ.

Cape Gooseberry—Analysis.—W. King, of the Government Laboratory, Durban, has analyzed the "cape gooseberry," the fruit of a sub-erect plant, native of South Africa, where it is much used for making jams and preserves. The fruit is enclosed in a large inflated calyx, is about the size and shape of a cherry, and when ripe has a greenish amber color. The analysis gives: Water, 82.61 per cent.; sugars (6.46 per cent. sucrose, 3.13 per cent. fruit sugar), 9.59 per cent.; woody fiber, 2.04 per cent.; protein, 2.68 per cent.; acidity (as citric acid), 1.69 per cent.; oil, 1.23 per cent.; ash, 0.82 per cent. The acids are principally citric, but include tartaric and malic acid.—Chem. News., Dec. 30, 1910, 320.

CUCURBITACEÆ.

Bryonia Dioica—Constituents of the Root.—The principal constituent of the root of *Bryonia dioica* described by previous investigators is bryonin, a glucosidic body to which various formulas have been assigned. Dr. F. B. Power and Dr. C. W. Moore have now subjected this root to a full chemical examination with the following results: The drug contains an enzyme which causes the hydrolysis of amygdalin, salicin, and also the glucoside of bryony. An alcoholic extract of the drug was prepared and distilled in steam, when a small quantity of volatile oil passed over.

The non-volatile residue consisted of a dark aqueous liquid and a brown resin. The aqueous liquid yielded to ether a colorless crystalline neutral substance, $C_{20}H_{30}O_5$, melting at 220–222°, specific rotation $[a]_D = +58.6°$. By treatment with amyl alcohol a yellow bitter amorphous glucoside product was obtained. The aqueous liquid also contained an amorphous alkaloidal principle and a sugar giving an osazone melting at 208–210°. The brown resin was extracted in the usual way with various solvents, but it was only from the petroleum-ether extract that any definite products were obtained. This yielded a phytosterol, $C_{27}H_{46}O$, which is optically inactive, oleic, linoleic, palmitic, and stearic acids, and a dihydric alcohol, bryonol, $C_{22}H_{34}O_2(OH)_2$, which gives color reactions similar to those of the phytosterols. This alcohol belongs to the series $C_nH_{2n-8}O_4$, of which three other members, ipurganol, $C_{21}H_{32}O_2(OH)_2$, grinderol, $C_{23}H_{36}O_2(OH)_2$, and cucurbitol, $C_{24}H_{38}O_2(OH)_2$, have been previously described by Dr. Power. The authors have also examined bryonin, and conclude that it is a complex mixture not entirely glucosidic in character. Physiological experiments made by Dr. Dale showed that bryonol and the alkaloidal substances are purgatives, but the glucoside is inactive.—Pharm. Journ. and Pharmacist, May 13, 1911, 626.

Colocynth—Allowable Percentage of Seed in the Powdered Drug.—The U. S. P. states that the seeds should be separated from the dried peeled fruit and should be rejected. Frank E. Lock considered it of interest to determine in how far this requirement is complied with in the powdered drug, which is often made without the preliminary removal of the seeds. He found the seeds to constitute about 66 per cent. of the entire dried fruit. In a consignment of colocynth pulp, about 72 per cent. consisted of a coarse powder, the remainder being unground pulp. The coarse powder when examined under the microscope, revealed the presence of seed fragments, which on comparison with colocynth powder containing known quantities of seeds (2, 5 and 10 per cent.), was decided to contain more than 2 per cent. and less than 5 per cent. of seeds—probably 3 per cent.; and if this is accepted as the percentage in the coarse powder, the percentage in the entire powder would be only about 2 per cent of seeds. It is certainly not commercially possible to exclude every seed from the pulp, and the author therefore considers it expedient that the Pharmacopœia make a reasonable allowance for the presence of small percentages in the powdered pulp.—Proceed. Pa. Pharm., Assoc., 1910. Amer. Drugg., Dec. 12, 1910, 336.

Pumpkin Seed—Inefficiency as a Tapeworm Expeller.—W. A. Puckner directs attention to recent investigations of pumpkin seed concerning the reputed value of this drug as a tapeworm expeller. Among these he quotes liberally from a paper communicated by F. B. Power and A. H. Salway, in which they record the results of an exhaustive study of the constituents to

which might be attributed the taeniafuge action of these seeds, if such they possess. In their experiments these authors separated the kernels of the pumpkin seed as completely as possible from the shells, and subjected them to strong hydraulic pressure, when they yielded a quantity of fatty oil, together with the so-called "press cake." The *fatty oil*, amounting to 19.3 per cent. of the weight of the entire seed (which yielded 34.3 per cent. to petroleum extraction), possessed the following constants: Sp. gr. $\frac{20^\circ}{20^\circ}$ 0.9220; acid value, 3.4; sapon. value, 189.4; iodine value, 119.7. It consisted of the glycerides of linoleic (45 per cent.), oleic (25 per cent.), and palmitic (30 per cent.) acids, together with a small amount of a phytosterol, $C_{27}H_{46}O$ (m. p. 162–163° C.), and apparently another substance of this class, having a lower melting-point. The "*press cake*" yielded to hot alcohol 8.7 per cent. of fatty oil practically identical with that obtained by expression, soluble protein products, sugar, a very small amount of salicylic acid, and about 0.5 per cent. of resinous material calculated on the weight of the entire seed. From the *resin*, a very small amount of phytosterol (m. p. 157–159° C.) and a new monocarboxylic acid (m. p. 97° C.), were separated. The *shells*, amounting to 20.8 per cent. of the entire seed, yielded a fatty oil, sugar, and a very small amount of resinous material. These various products were subjected to physiological experiment, but neither the fixed oil or the resin, or any parts thereof, were found to exert any taeniafuge activity.—Midl. Drug. and Pharm. Rev., Aug., 1911, 334–836; Journ. Amer. Chem. Soc., 1910, 346.

MYRTACEÆ.

Mauritius Cloves—Status of Culture Experiments and Quality.—It is stated in the "Bulletin of the Imperial Institute" (*8*, [1910]3) that cloves grown in Mauritius, according to expert opinion, equal good pale Zanzibar quality, but that at present the cultivation in Mauritius is still in the initial or experimental stage. A sample of Mauritius cloves examined at the Imperial Institute in London yielded 18.1 per cent. of oil, containing 89.1 per cent. of eugenol, and showing the following constants: sp. gr. at 15°, 1.0514; opt. rot.,—0°23′; soluble in 2 vols. and more of 70 per cent. alcohol.—Schimmel's Rep., Oct., 1910, 40.

Zanzibar Cloves—Historical Notes Concerning the Cultivation.—In a paper recently read before the Congress of Tropical Agriculture in Brussels by R. N. Lyne, director of Agriculture in Zanzibar, some interesting historical particulars are given concerning the culture of cloves on that Island, from which it appears that the first cloves were brought by Arabs to Zanzibar and Pemba from the Moluccas, via Réunion, in the year 1808, but that many years elapsed before it was recognized that the Zanzibar district of Africa was especially suitable for the culture of cloves. By 1860, however, the total yield of the Zanzibar and the Pemba cultures

was estimated by the British Consult at 7 million lbs.; but the year 1871 marked a turning point in the clove industry, inasmuch as England compelled the Sultan of Zanzibar to issue an edict against the state trade, in consequence of which the cost of labor was materially increased, while in the same year a typhoon destroyed the whole of the plantations in Zanzibar. New plantations were, however, immediately laid down, and in 1895 a crop was gathered amounting to double that of the period preceding the catastrophe. Since then, though experiencing various impediments which proved unfavorable to the clove industry, it recuperated quickly, and has progressed to reach its present state of prosperity.—Shimmel's Rep., Oct., 1910, 39.

Eucalyptus Growing on a commercial basis for oil is discussed by Edward C. Binz, who points out the superior quality of the California oil to the Australian product, in "Proceedings," 1910, 602–604.

Granatum (*Pomegranate*)—*Historical Sketch.*—John Uri Lloyd contributes a brief historical sketch of *Punica granatum*, which has been found in cultivation from the earliest historical times, and was included among the vegetables that were held sacred by the Assyrians and the Egyptians. The pomegranate had undoubtedly an occult significance with the ancient nations. Many passages scattered throughout the Bible refer to this plant, and the fruit and seeds of the pomegranates are often mentioned in the "Arabian Nights." Of the writers of the Middle Ages, may be mentioned Tragus and J. Bauhinus, the latter giving a most detailed compilation of that which was known before his time on the subject of the pomegranate, including the myths with which it is connected. The Greek authors (Theophrastus, Dioscorides) as well as the Roman authors (Cato Censorius, Pliny, Celius, and others) were well acquainted with its medicinal properties and uses; but it was not until the present century (the 19th? Rep.), that the literature of the pomegranate was enriched by the study of its chemical aspects.—Amer. Journ. Pharm., May, 1911, 211–213.

Melaleuca Trichostachya and M. Bracteata—Yield and Properties of Volatile Oils.—In a paper read by Baker and Smith before the Royal Society of Australasia, the following information is given respecting two species of *Melaleuca* and the oils obtained from them:

Melaleuca trichostachya (syn. *M. linariifolia* Sm.) is widely distributed throughout the southeastern part of Australia. The oil, obtained from the leaves and the tops of the branches in a yield of 2.5 per cent., is colorless when rectified and contains from 85 to 95 per cent. of cineol.

Melaleuca bracteata is a small tree or shrub which grows profusely in the Warialda district of New South Wales. The oil, obtained in a yield of 1 per cent. from the leaves and tops of the branches, has very different properties from the preceding oil, and its composition differs from that of the other melaleuca oils. Its specific gravity is higher than that of water, and

it contains large proportions of methyleugenol and cinnamic aldehyde, as well as cinnamic acid—the latter both free and in combination.—Schimmel's Rep., April, 1911, 81; from The Chem. and Drug. and Pharm. of Australia, *26* (1911), No. 1, p. 6.

Niaouli-Tree—Occurrence in New Caledonia and Description.—R. Koch gives some interesting particulars respecting the occurrence and distribution of the Niaouli-tree (*Melaleuca viridiflora*, Brougn. et Gris.) in New Caledonia. This tree is distributed plentifully throughout the island. It resembles our birch tree in the pale color of its bark, and it is said that in marshy districts it purifies the air, kills the mosquitos and prevents the occurrence of fever. The wood, which is very durable, is a favorite material for shipbuilding, while from the bark a great variety of articles is manufactured. In addition to New Caledonia the niaouli-tree also occurs in Annam, where it is known to the natives by the name of *Cay-Tram.* — Schimmel's Rep., Oct., 1911, 62; from "Parfum. moderne," *4* (1911), 50.

ROSACEÆ.

Almonds—Conversion of Hydrocyanic Acid During the Ripening of the Fruit—G. de Plato has made a series of experiments with the object of investigating the conversion of hydrocyanic acid during the ripening of the almonds. His results are summarized below: In the case of bitter almonds the percentage of semi-combined hydrocyanic acid (=acid which can be eliminated by steam-distillation), gradually decreases as the fruit ripens, and disappears completely when it has attained maturity; the percentage of hydrocyanic acid in combination rises until the cotyledons are being formed, after which it decreases, (but without disappearing altogether) until the cotyledons have hardened. In the case of sweet almonds the percentage of semi-combined as well as of glucosidic hydrocyanic acid decreases when the cotyledons begin to develop, and has disappeared completely when they have hardened. As the fruit matures the nitrogen gradually assumes a stable form as albumen-nitrogen, until the fruit is quite mature, by which time 97.24 per cent. of the total nitrogen has assumed this form. This process, therefore, is the reverse of that which takes place during germination, when the albuminous bodies undergo conversion into amygdalin, the new organs requiring for their development the presence of bodies rich in energy-producing constituents. In the process of the maturing of the almonds the amygdalin may be regarded as the intermediate product in the formation of albumen. With sweet almonds the process of conversion of matter is more rapid, preventing the accumulation of amygdalin; in fact the last-named body is used up with great rapidity.—Shimmel's Rep., Oct., 1911, 19; from An. del. R. Stazione chimico-agraria sperimental., 1910, Rome, 1911.

Pear and Quince Leaves—Glucosidal Constituents.—E. Bourguelot and

A. Fichtenholz, by the biological method, modified for plants rich in tannin, have succeeded in demonstrating the presence of a glucoside in the leaves and buds of pear trees, and ultimately in isolating it. It proves to be true *arbutin*, a glucoside which has not hitherto been obtained direct in a perfectly pure state (the arbutin hitherto found has been accompanied by methyl arbutin). True arbutin forms prismatic needles; it commences to fuse at 140° C.; then resolidifies and finally melts at 191-193° C. with decomposition. It contains one molecule of water of crystallization. The optical rotation of the air-dried glucoside is —59° 80′ to —60° 38′, and when dried at 110° C. —63° 75′ to 63° 84′. When hydrolized it furnishes the theoretical quantity of hydroquinone. The glucoside is found in the leaves of all the varieties of pears examined.

The leaves of the quince were also found to yield a glucoside; but this is not arbutin. It is cyanogenetic, and may be prulaurasin, since it gives approximately the amount of glucose on hydrolysis as is obtained from that substance. These results are interesting from a biological point of view, for pears are very frequently grafted on quince stocks; and it is evident that the leaves of the two species form different assimilation products. —Pharm. Journ. and Pharmacist, Sept. 17, 1910, 365; from Journ. de Pharm. et Chim., 1910, *2*, 97.

Apples—Constituents of the Peel.—In a preliminary research, C. Thomas finds that when fresh apple peels are subjected to distillation with steam, the distillate usually contains only a few flakes of solid substance, occasionally also a thin scum of oily particles, eventually forming oily drops. If the distillate is then shaken out with ether and the ether evaporated, a soft mass remains as residue from which, on the addition of a little absolute alcohol, well-formed crystals separate. When these are removed by filtration, the filtrate leaves on evaporation a yellow oil having a strong odor of apples. If then the apple peels, which have thus been deprived of their odorous constituent, are extracted with ether, the ethereal solution yields on evaporation a solid, colorless, pulverulent substance in abundance, which is readily soluble in hot alcohol, but again deposited on cooling. When purified, this substance is odorless and has a melting-point above 200° C. The author surmises that this pulverulent constituent, together with a little vegetable fat or resin, serve to form a protective coating which prevents the fruit-pulp of the apple from completely drying.—Pharm. Ztg., lvi (1911), No. 75, 757; from Journ. f. prakt. Chem., 1911, 247–248.

Potentilla Fulgens, Wall— Medicinal Use of the Roots in India.—Quoting from the annual report for 1910–11 of the Industrial Section of the Indian Museum, David Hooper says that during a tour in the Khasia Hills, Assam, last October, the roots of the wild potentilla, *Potentilla fulgens*, Wall, were found to be sold in the bazars as an astringent. The roots

occurred in bundles, and were called "Lyn-mang." They were used in the place of catechu, and chewed with betel and pan. The powdered roots yielded 39 per cent. of extract to hot water, and contained 9.2 per cent. of tannin. Other potentilla roots used medicinally in India are those of *P. nepalensis*, Hook, in the Punjab, and *P. supina*, Linn., in Sind.—Pharm. Journ. and Pharmacist, Sept. 9, 1911, 350.

Prunus sphærocarpa, Sw.—Constituents of Bark, Leaves, Flowers and Seed.—According to Peckolt the bark of *Prunus sphærocarpa*, Sw., a tree which is common in the mountainous parts of most of the states of Brazil, when distilled yields 0.046 per cent. essential oil with an odor of oil of bitter almonds; $d_{18°}$ 1.0409. The flowers of the tree also possess a benzaldehyde odor. From the seed Peckolt isolated 0.910 per cent. crystalline amygdalin, but from the leaves and the bark he only obtained an amorphous substance, which, however, reacted with emulsin. The green leaves yielded a weak distillate, the hydrocyanic acid content of which varied greatly according to the month in which the distilling had taken place. For instance, the green raw material yielded:

Early in March (summer), 0.085 per cent. anhydrous hydrocyanic acid.

Early in September (winter), 0.0016 per cent. anhydrous hydrocyanic acid.

Early in December (spring), 0.005 per cent. anhydrous hydrocyanic acid.—Schimmel's Rep., April, 1911, 97; from Ber. d. Deutsch. Pharm. Ges., *20* (1910), 594.

Raspberries — Formic Acid a Natural Constituent. — According to Rohrig, formic acid is a natural constituent of raspberries. The quantity present is very small, equivalent to 0.0001761 per cent. of the fresh fruit, and to 0.0000722 per cent. after fermentation. Its presence was determined by Wagner's method, which consists of distilling the fruits, neutralizing with caustic soda, evaporating to dryness, and treating the dry residue with sulphuric acid in a special apparatus, measuring the volume of carbon monoxide formed. Each Cc. of this gas is equivalent to 2 milligrams of formic acid.—Pharm. Zentralh., li (1910), No. 38, 881.

LEGUMINOSÆ.

Acacia—Antiquity and Uses.—J. Leon Lascoff speaks interestingly about acacia in a paper read before the Brooklyn Pharmaceutical Association: its antiquity, which antedates our era by seventeen centuries, and the many uses to which it is put in spite of its being medicinally inert, or possibly because of its inert qualities, rendering it useful for a variety of purposes from which it would otherwise be excluded—such as emulsionizing oils, suspending solids in liquids, etc. These various uses are explained by a number of instances.—Amer. Drugg., Feb. 14, 1911, 67–68.

Nigerian Gums—Source and Characters.—According to Dr. J. M.

Dalziel, the term "Nigerian Gum" is given to any white or nearly colorless gum collected in the Bornu and Yola provinces, gum culture being unknown in Nigeria, and the desultory collection being done at random. The hashab tree of the Kordofan district, *Acacia senegal*, is abundant in the Bornu province, where gum is a predominating forest product. In the Yola province a large acacia, probably *A. sieberiana*, is pointed out as the source of falli. Marrua (the term given to yellowish or reddish varieties of gum) is with little doubt the product in Yola of *A. Seyal*, though some may be derived from *A. Xanthophlœa*. Both falli and marrua are in the form of large tears, lumps, or broken fragments, or, occasionally, pencils. Falli becomes opaque owing to the formation of fine fissures, but marrua usually retains its glassy surface. Most of the gum gathered in the Yola province consists of mumuye, which is in lumps or masses of a dark or smoky appearance, and is derived from one or more species of *Combretum*, usually *C. leonense*. The Resident of the Bornu province states that four trees in that country yield gum of marketable value—viz., kolkol (*Acacia Senegal*, Willd.), karumga (*Acacia Seyal*, DC.), katalabu (*Acacia Sieberiana*, DC., probably), and gulawai. The identifications were made at Kew. The investigations establish the fact that the principal sources of gum in Bornu and Yola are the same species as the important Sudan and Senegal gums. Also that it is not improbable that by educating native collectors much of the variability in quality of Nigerian gum could be avoided. The main results of the investigations are summarized below.

Source of gum	Moisture per cent.	Ash per cent.	Matter insoluble in water per cent.	Strength as measured by viscosity	Color of mucilage
BORNU PROVINCE.					
Acacia Senegal...	10.2–11.4	2.8–3.1	1.2–1.9	5.3–6.5	Almost colorless to pale brown
Acacia Seyal ...	11.1–11.4	2.5–2.6	0.8–1.4	5.8–6.6	Brown
YOLA PROVINCE.					
Acacia Suma ...	13.3–13.6	2.0–2.3	4.1–4.5	14.1–1.77	Colorless to brown
Acacia Sieberiana.	13	2.6	0.7	13.3	Pale colored
SOKOTO PROVINCE.					
Combretum sp. ...	12.6	2.0	1.2	7.8	Dark brown

Chem. & Drug., Mar. 11, 1911, 90; from Bull. Imper. Inst., viii, 1910, No. 4.

Tragacanth—Correction of U. S. P. Test.—Albin H. Warth says that genuine tragacanth, from *Astragalus gummifer*, is produced only in the regions west of India, and that if the Indian gums are to be excluded, a definition of the source should be incorporated in the official (U. S. P.)

description. Moreover, the official tests require revision. There is not a single test given by the U. S. P. which will serve to detect the presence of the gums of: *Anageissus latifolia, Sterculia tragacantha, Cochlospermum gossypium, or acacia Senegal.* The existing tests also require modification. Instead of adding 50 parts of water to the powder, the powdered gum should be added to 50 parts of lukewarm water, stirring from time to time until the cloudy gelatinous mass is formed. The formation of a yellow color when this gelatinous mass is warmed with sodium hydroxide is generally considered a distinctive test; but a large quantity of sodium hydroxide with prolonged heating, gives a similar reaction with Indian gums, and the U. S. P. should therefore specify the quantity of NaOH to be used, and the degree and time of heating. The addition of iodine T. S. to the same solution will not cause the blue coloration described, unless the quantity of NaOH is extremely small, and the quantity of iodine T. S. added, very large. Finally, the addition of alcohol to a fluid portion, is of no value. This test, the most delicate of all, depends on the presence of arabin in tragacanth, and should be carefully described. Gum arabic, when present, would give a like result, but Indian gums do not yield the precipitate, which even in genuine tragacanth is produced only when the solution is sufficiently concentrated.—Pract. Drugg., July, 1911, 34.

"Indian Gum"—A Commercial Substitute for Tragacanth.—Two years ago (in Proceedings, 1909, 218) Professor Feil directed attention to a material on the market which served the purpose of a sophistication of powdered tragacanth. In a short note he now again directs attention to this material, of which he has had occasion to examine about twenty-five additional samples. While there is a certain general resemblance, yet each sample has a peculiarity that marks it quite distinctly and it is practically impossible to get samples to match any particular powder; nor is it possible to obtain it in any other form than that of powder, since it is claimed that it is imported only in the pulverized condition. Within the past three months the custom authorities have refused entrance of this substance under the name of gum tragacanth under which it had been admitted, but permit its entry as "Indian gum." Since this gum has a very large number of technical uses and for some purposes is claimed to be superior to gum tragacanth, it seems desirable that experiments be made to establish its identity and properties.—Proc. Ohio State Pharm. Assoc., 1910, 74.

Balsam of Peru—Examination of Genuine and Sophisticated Samples.—Caesar & Loretz report that direct importations of balsam of Peru during 1910 showed a cinnamein content of 58.3 to 62.7 per cent. and a sp. gr. of 1.152 to 1.157—the latter being higher than is admitted in most pharmacopœias, while samples known to be sophisticated varied in cin-

namein-content from 46.3 to 55.1 per cent. and had in one case the low sp. gr. of 1.138, in two others the abnormally high sp. gr. of 1.164 and 1.178, notwithstanding that the ester and saponification numbers fluctuated without the limits demanded for the genuine balsam. The nitric acid test serves well for the differentiation of genuine and sophisticated balsams, but only if the sp. gr., the cinnamein-content, and the physical constants are taken in consideration for comparison.—Pharm. Ztg., lv (1910), No. 78, 780.

Balsam of Peru—Precaution in Making the Chloral Hydrate Solubility Test.—In connection with a report on the commercial quality of balsam of Peru, according to which 12 different importations proved satisfactory, whilst 20 samples on the market proved more or less suspicious, either on the ground of deficiency in cinnamein, sp. gr., and other constants, or the color reaction with nitric acid, G. Fromme directs attention to a possible source of error in making the solubility test for fixed oil with concentrated chloral hydrate solution, as described in the G. P. V. This test is based on the complete solubility and formation of a clear solution when 1 p. of the balsam is mixed with a solution of 3 p. dry chloral hydrate in 2 p. of water. If turbidity results, this is assumed to be due to the presence of fixed oil; but the author cautions against this assumption, unless the conditions of the test are carefully observed. In the first place, the turbidity may be due to mechanical impurities in the balsam, which, if the balsam is not itself perfectly clean should be removed by filtration before applying the test, but, secondly, turbidity will also result, in the absence of fixed oil, if the chloral hydrate used is not *actually* dry. This being hygroscopic, it is liable to absorb moisture on the shelf, and sufficient water may thus be introduced to render the test untrustworthy. The proper safeguard is to insure the absolute dryness of the chloral hydrate by preserving it in the lime-closet, from which it should be removed only when making the test.—Pharm. Ztg., lvi (1911), No. 76, 765; from Jahr.-ber. v. Caesar and Loretz, 1911.

African Copaiba—Method of Detection.—F. Tusting Cocking observes that some time ago a series of experiments were carried out in the laboratories of the British Drug Houses, Ltd., and a process for the detection of African copaiba in South American copaiba arrived at, which has been found trustworthy and very useful in actual practice, so that it appears to be desirable to record a brief account of the method:

The oleo-resin is submitted to distillation either by steam or *in vacuo*, and the volatile oil so obtained is dried, then fractionally distilled to dryness *in vacuo*. Ten equal fractions are collected, and the optical rotations of each of these determined in a 100-mm. tube.

If the sample be pure the figures obtained will all be negative, and they will increase arithmetically from the first to the last fraction, although not

regularly. If, now, the rotation of the first fraction be subtracted from that of the tenth, a figure will be obtained which varies very little for genuine samples, and is always a negative quantity. This figure, which the author called the "difference value," has only varied in his experience from —3.7° to —7.6°.

When African copaiba is examined in this manner, the rotations of all the fractions are, as would be expected, dextrogyrate, and the rotations of the successive fractions increase, but to a much greater extent than with the South American copaiba, in consequence of which the difference value is much greater than copaiba and is a positive figure. The figures also show a curious feature in that the tenth fraction has a considerably lower rotation than the ninth. The author's paper is accompanied by tables showing the actual results obtained with different samples of South American, African, and adulterated copaiba.—Drug. & Chem., July 23, 1910, 51.

Honduras Balsams— Chemical Examination of the Pale and the Dark Varieties.—A. Tschirch and J. O. Werdmueller communicated the results of a comprehensive chemical investigation of pale and of dark Honduras balsam. Three samples of

Pale Honduras Balsam varied in specific gravity from 1.0884 to 1.0905; the mean acid value was 32.67 and the saponification number 173.2, equivalent to 8.6 per cent. of free and 45.6 per cent. of total cinnamic acid. The ethereal solution of the balsam yielded, when treated with 1 per cent. sodium carbonate solution, cinnamic acid, and a resinol resin. The latter, when saponified, was separated into cinnamic acid and honduroresinol $(C_{16}H_{26}O_2)_n$, melting at 166–167° C., insoluble in caustic potash solution. It is accompanied by a compound $(C_{22}H_{34}O_4)_n$, melting at 160° C., soluble in dilute caustic potash solution and giving phytosterol reactions. The residual ether solution, after treatment with sodium carbonate solution, yields further amounts of cinnamic acid ester of honduroresinol when shaken out with 1 per cent. caustic potash solution. This also yields a compound soluble in caustic potash solution, giving phytosterol reactions, and having the formula $(C_{20}H_{32}O_5)_n$. During the shaking-out a white flocculent substance separates, from which, by treatment with boiling 1 per cent. alcoholic potash solution, β-honduroresene is separated; this has the formula $(C_{38}H_{38}O_4)_n$, melts at above 300° C., and is insoluble in alcoholic potash and in most organic solvents. The portion of the balsam soluble in ether unaffected by these alkaline extractions, the so-called "cinnamein," was fractionated *in vacuo* and separated into three fractions, which gave, besides cinnamic acid when saponified, a small amount of minute needles, melting at 58° C.; a hydrocarbon, hondurane, C_8H_{10}, boiling at 154–155° C.; and a small amount of distyrol. Another portion of this "cinnamein" was saponified with boiling 1 per cent. caustic potash solution, and the saponified product was steam-distilled. The non-volatile

residue was then fractionated *in vacuo*. In this way, in addition to cinnamic acid, a hydrocarbon $(C_3H_4)_n$, possibly C_9H_{12}, hondurane, distyrol and cinnamic alcohol were isolated. The cinnamein probably contains the phenyl propyl cinnamate or hondurol.

Dark Honduras Balsam was found to vary in specific gravity from 1.0915 to 1.0897; acid value, 29.9; saponification value, 153.9; equivalent to 7.89 of free and 40.59 of total cinnamic acid. When treated in ethereal solution with sodium carbonate as described with the pale balsam, cinnamic acid and a honduro-resinol, $C_{16}H_{26}O_2$, melting at 141° C., were obtained. The latter forms a crystalline sodium salt. It is accompanied by a substance $(C_{20}H_{30}O_4)_n$ soluble in caustic potash solution and melting at 163° to 165° C. On then shaking out with 1 per cent. caustic potash solution, cinnamic acid, some honduro-resinol cinnamate, a substance $(C_{16}H_{26}O_4)_n$ giving phytosterol reactions and a resene were separated. On saponifying the so-called cinnamein, the portion of the saponification produced which is not volatile when steam distilled, when dissolved in absolute alcohol and cooled in solid carbon dioxide, gives a crystalline mass. On treating this with petroleum ether, an insoluble resene, melting at 163°, is separated. The crystals when pure have the melting point 42.5° and the formula $C_{17}H_{16}O_2$, and have been named hondurol. The mother liquor from which this separates contains phenylpropylalcohol and distyrol.—Arch. d. Pharm., *248*, (1910), No. 6, 420.

Cabure Balsam—Chemical Examination.—A. Tschirch and J. O. Werdmueller examined a small amount of "cabure balsam," contained in a calabash, by Tschirch's method. The ether solution, when shaken out with 1 per cent. sodium carbonate, afforded benzoic acid and the benzoate of a resinotannol. On saponifying this ester cabure-resinotannol, $C_{14}H_{13}O_4$, and benzoic acid resulted. The former gives, in alcoholic solution, an olive-green color with ferric chloride, afterwards a brownish-black precipitate; an orange color with potassium chromate; a light brown precipitate with lead acetate. Vanillin was present among the saponification products. No cinnamein was found in the balsam.—Arch. d. Pharm., *248* (1910), No. 6, 431.

Derris Elliptica—Characters of Active Constituent.—W. Lenz has extracted from the roots of *Derris elliptica* by means of boiling benzene a crystalline principle possessing the poisonous properties of the drug, which is used in Java as an insecticide and fish-poison, and is also said to be a constituent of the Borneo arrow-poison called "Siren." The new principle, for which the author proposes the name

Derrin, crystallizes from benzene in delicate yellowish laminae, which are rendered nearly colorless by washing with cold ether. It is obtained in colorless crystals also from its alcohol solution; melts at about 158°, and is readily soluble in acetone, benzene (benzol) and chloroform, but difficultly in cold alcohol and cold ether.

The new substance must not be confused with "derrid," an amorphous, resinous body isolated by Greshoff (see Proceedings, 1891, 655) from the root-bark of the plant, and is described by v. Sillevoldt as a yellow powder, melting at 73°, and having an aromatic taste, followed by a benumbing sensation similar to cocaine.—Arch. d. Pharm., *249* (1911), No. 4, 298–304.

Derris Stuhlmanni—Constituents of the Root-bark.—W. Lenz records some preliminary investigations of the root-bark of *Derris stuhlmanni* received from German East Africa where it is employed as a snake antidote both externally and per os. It yielded to petroleum ether 3 per cent. of a colorless fat of ointment consistence; then to ether 5 per cent. of a white wax-like mass, melting at 89°–90°, and evidently mainly composed of a wax-alcohol; then to alcohol 2 per cent. composed mainly of resin and wax free from tannin and sugar, having a vanillin-like odor without, however, giving its reaction. The extracted material then yielded 10.2 per cent. of a mucilaginous substance to water, constituting when completely dry a horn-like mass, having an insipid sweetish taste, and containing an abundance of sugar.—Ibid, 304–305.

Erythrina Zeyheri—Constituents of the Seeds.—E. Langham has subjected the seeds of *Erythrina zeyheri*, a leguminous South African plant, to chemical examination. This plant has an average height of 45 Cm. The stems, leaves and leaf-stems are covered with prickles, which emerge from the ribs on the stems and the veins on the leaves, and on the stems towards the root, thus affording some protection from being eaten by ruminants. The seeds are covered with scarlet testa, and contain a quantity of a bland, nutty oil, a volatile oil, and an alkaloid. The seeds of *Abrus precatorius*, also of the same order of plants, possess scarlet testa, but with a black spot on one side, and are used in making rosaries and necklaces. The seeds of *Erythrina Zeyheri* are also employed by Kaffirs in South Africa for making necklaces. The color of the seed integuments does not yield itself to chloroform. The ripe seed-pods vary in length from 4 to 12 inches (10 to 30 Cm.); the average weight of each seed is 20 grains. They yield to ethereal extraction 28 per cent. of fixed oil and 4 per cent. of volatile oil (*erythrol*), the latter being powerfully irritant and having the pungent odor of horseradish, while the fixed oil is simply an aperient, free from pungency. By alcoholic extraction, an alkaloid (*erythrine*) is obtained in a yield of 15 per cent. This is insoluble in ether or benzol, and gives a purple precipitate with auric chloride, while when boiled with ammonia or caustic potash its solutions assume a sap-green color. It also gives the characteristic reaction with Thresh's alkaloidal reagent. Touched with nitric acid, erythrine gives a bright color, changing to red; with sulphuric acid it gives a dull red color. When boiled with dilute sulphuric acid it splits off *erythringen*, and the resulting

solution when rendered strongly alkaline with caustic potash and warmed with cupric sulphate, throws down a crimson-scarlet precipitate.—Chem. and Drugg., April 29, 1911, 134.

Licorice—Cultivation in Moravia.—Prof. H. Mitlacher gives some interesting information concerning the cultivation of the licorice plant in the Austrian province of Moravia, where it is conducted on an extensive scale on the southern declivities of the hills encompassing the Thaja river in the loose sandy soil that is equally adapted to grape culture. In fact, the two crops are periodically alternated in some sections. The fields are planted with sections of runners about the thickness of a finger and 30 cm. in length, in a slanting or horizontal position, about ½ m. apart and to a depth of about 30 cm., and then covered with soil. The plantation is then left practically without attention for 4 years, the time required for the maturing of the crop; the only attention given being the occasional loosening of the soil and the removal of weeds, or unhealthy plants. During the first year the plants only produce thin switches, which in the following years develop into strong densely foliated stems and reach their maturity in the fourth year, when the crop of licorice root is collected. From the root-stocks and the runners remaining in the ground, new plants are then produced, reaching as before their maturity in four years, so that crops of root are obtained in a number of successive periods of four years each, depending on the fertility of the soil, aided at the beginning of each period with the application of manure, until the soil is practically exhausted. The planting may be done during the first half of April or in the fall of the year; the harvest begins in September and continues until the middle of March. The product, consisting of handsome thick roots and runners, commercially designated as "roots," is light-yellow in transverse sections and has a pure sweet taste, while an inferior product, composed of the shoots of the subterranean stem and small runners, is used for the purpose of making licorice paste, which is also made largely in Moravia from the better "roots."—Pharm. Ztg., lvi (1911), No. 57, 570; from Pharm. Praxis, 1911, No. 6.

Licorice — Valuation of the Root and Commercial Extracts. — Ella Eriksson contributes an interesting and practical paper on the valuation of licorice root and the commercial extracts prepared from it, on the basis of the sweetening components of the same. While glycyrrhizin must be regarded as the principal sweetening ingredient, and its estimation is therefore of primary importance, the valuation of a sample of root or extract is not complete without the determination of the sugars—saccharine and glucose—which are also present, though in variable quantities. In fact, in the experience of the author's investigations, the quantities of these three sweetening substances fluctuate considerably not alone in the root, but more particularly in the extracts. It seems quite probable that the gly-

cyrrhizin undergoes changes in the course of manipulation, and it may therefore be assumed that these various bodies, in some as yet unexplained way, are transformed, the one into the other. The author gives explicit directions for determining the three varieties of sugar, by a method which is based upon their respective reactions with Fehling's solution, and may be outlined as follows:

(1) *Glucose*, by allowing the original solution (obtained by percolation or solution) to remain in contact with Fehling's solution, *in the cold*, during 15 hours, then collecting and weighing the cuprous oxide formed.

(3) *Saccharose, by boiling* the filtrate obtained from (1) for a short time, collecting and weighing the cuprous oxide.

(3) *Glycyrrhizin*, by *prolonged boiling* of the filtrate from (2) and estimating its quantity on the basis of the glucosonic acid indicated by the further reduction of Fehling's solution.

Of the two sugars, saccharose is in preponderence. But that certain changes occur in the sweet principles of licorice root during its manufacture into extract is evident from the fact that, although the average yield of extract is 30 per cent, and the glycyrrhizin content in the root fluctuates between 6.49 and 8.15 per cent., the latter fluctuates between 9.85 and 23.9 per cent. in the extracts yielded in the proportions mentioned.—Arch. d. Pharm., *249* (1911), No. 2, 144–160.

Lotus Corniculatus—Presence of Cyanogenetic Glucoside Apparently Depends on Variation of Season and Locality.—At a recent meeting of the Royal Society, H. E. Armstrong, E. F. Armstrong and F. Horton read a suggestive communication on the occurrence of a cyanogenetic glucoside in the common *Lotus corniculatus*. In the early summer of 1910 plants growing on the Thames bank at Reading were found to contain the glucoside, but hydrocyanic acid could rarely be found that year in plants collected in other localities later in the season. This year, specimens obtained from different British localities have rarely failed to give hydrocyanic acid. This may be due to the marked climatic differences of the two summers. This year plants have been obtained from all over Europe. In no case was hydrocyanic acid obtained from plants grown in Norway, where conditions have favored luxuriance rather than maturity of growth. The glucoside is usually accompanied by an enzyme. The latter may, however, occur without the glucoside. The form of *Lotus corniculatus* known to botanists as var. *major* (*uliginosus villosus*) contains neither glucoside nor enzyme; it would seem, therefore, that this may be regarded as a distinct species.—Chem. News, 1911), *104*, 276.

Senna—Adulteration with Young Ailanthus Leaves.—Dr. W. Witlacher directs attention to an adulterant for senna leaves, which is offered in the Venice drug market under the name of "Foglie uso Senna." Microscopic examination revealed this adulterant to consist of the young leaves of

Ailanthus glandulosa. The diagnostic distinction of the true senna and of its adulterant are so pronounced as to permit the easy recognition of the adulterant even in the powdered drug.—Pharm. Ztg., lvi (1911), No. 38, 380; from Zschr., d. Allgem. Oesterr. Apoth. Ver., 1911, No. 4.

"*Greek Hay Seed*"—*A Synonym for Foenugreek*.—Prof. I. V. Stanley Stanislaus mentions that some time ago Professor Vanderkleed sent to him a representative of one of the local drugmillers in quest of information about the Greek hayseed, an article which appeared in household receipts published in various magazines, which were traced to Pennsylvania German origin, in which it appeared as "Griechischer Heusamen." Referring to Hager, Professor Stanislaus found the latter to be a synonym for the seed of *Trigonella Fœnum Græcum* L., and on exhibiting some foenugreek to the person inquiring for it, he identified it as being the article desired. Professor Stanislaus adds that, according to the statement of the drug-miller, unusually large orders for foenugreek were being received. It seems to be used in form of decoction for sexual impotency; according to LaWall, also, it is generally employed to give maple flavor to confectionery."—Amer. Drugg., May 8, 1911, 278.

Soja Beans—Economic Value.—In their "Spring Report" for 1910, Gehe & Co. direct attention to the remarkable increase in the importation of soja (or soya) beans and their economic uses. The large content of the albuminoids in these beans (the seeds of *Dolichos soja* or, more modernly, *Soja hispida*), and the relatively small content of carbohydrates, make them a valuable food product, which is particularly adapted as such for diabetics, and, as a matter of fact, soja meal and flour have been used and recommended for preparing bread and biscuits as long as twenty years ago. Moreover, the large percentage of oil—a drying oil—increases the economic value of soja beans, although its contemplated use as a substitute for linseed oil has not proven entirely satisfactory. Medicinally, soja beans have also been exploited in the form of a specialty named "Sarton."—Pharm. Ztg., lvi (1911), No. 32, 324.

Soja Beans—Botanical Variations and Causes.—In connection with the preceding abstract the following from a recent paper contributed by Dr. Reno Muschler is interesting, showing the great botanical variations of the plants from which the soja beans are derived and explaining the probable cause of these variations. Dr. Muschler says that soja beans were first mentioned in Europe by Kämpfer in his "Amoeniatum Exoticarum" (1712), in which he describes the plant (on p. 837) under the name "Diadsu Mame" as an upright growing bean resembling a Lupine, bearing seeds the size of a large white bean. Linné described the plant under the name of "*Dolichos*" in his "Flora Zeylanica" (1747) and subsequently in his "Species Plantarum" (1753), illustrates and describes the plant by the specific name "*Dolichos soja*," mentioning that it is in-

digenous to India. This name was changed about 40 years later, by Moench, to "*Soja hisbida*," and this again (1873) was changed by Maximowics to

Glycine hispida, a title which is now generally accepted to designate the true soja bean, the mother plant of which is by Maximowics believed to be a wild species (*Glycine soja*, Lieb. et Zucc.=*Glycine ussuriensis*, Regel et Maack.) growing in Japan. This wild species is distinguished from the cultivated *Glycines* by the thinner stems, which are sparsely hirsute, its smaller seeds and its very much smaller flowers, all of which are subject to extraordinary variations in the cultivated plants; so much so, that a number of authors have endeavored to systemize these variations in accordance with the specific variations observed. So Martens, for example, enumerates no less than 13 varieties, under 3 sub-species, which are differentiated by the shape and size of the legumes, the shape, size and color of the seeds (which may be black, brown, green or yellow), and the characters of the foliage. A similar classification is given by Harz, who distinguishes 8 varieties under two sub-species. But these classifications are of little practical value owing to the great change to which all the organs of the plant are subject under cultivation. The stem changes in size and in the character of the branching. Beside the rigid upright position taken by some of the plants, others assume a recumbent position and lay flat on the ground. The internodes may also become shortened in the shrubby form of the plant, while the leaves are liable to vary from the usual oval-lanceolate to a perfectly circular form, and also exhibit variations in color, from pale to dark green. The flowers likewise vary in color, some being white, others red. The fruits vary in shape, some of the legumes being flattened, others bulging out to a cylindrical form, while the seeds, as previously mentioned, vary very considerably in color, size and shape.—Pharm. Ztg., lvi (1911), No. 41, 415–416.

ANACARDIACEÆ.

Anacardia Seeds (*Cashew nuts*)—*A Substitute for Almonds.*—C. Schenk calls attention to cashew nuts—the seeds of *Anacardia occidentalis*—which have recently found favor as substitutes for almonds in confectionery. Although indigenous to Brazil, the acajou tree has now spread thoroughout the tropics, the fruits and nuts produced in the territory of Goa on the Malabar coast being the most highly esteemed. The kernels which constitute a favorite desert in India, differ in their chemical constituents from almonds in having a smaller content of nitrogenous bodies and crude fiber, but a markedly larger proportion of non-nitrogenous extractive matter. They contain about 45 per cent. of fixed oil (acajou oil), which is used as table oil in Brazil, and has the following constants: sp. gr. $\frac{15°}{15°}$ =0.9184; refraction number, 54.3; acid number, 1.1; iodine number, 82.8; saponification number, 200.0; Reichert-Meissl

number, 0.6. No color with Bellier's test, or the furfurol reaction. These numbers agree very closely with those of olive oil.—Schw. Wschr. f. Chem. u. Pharm., xlviii (1910), No. 46, 709.

Juglans Regia, L.—Use of the Hulls of the Fruit as Adulterant for Vegetable Powders.—Prof. Henry Kraemer has subjected to microscopic study a sample of "vegetable shells," which were exhibited by Mr. E. H. Gane at a pharmaceutical meeting of the Philadelphia College of Pharmacy, with the statement that they were probably imported for the purpose of replacing walnut shells, olive pits, etc., owing to the ease with which these latter products can now be detected when used as adulterants. These shells were recognized on preliminary examination as the pericarps of some fruits, and when subjected to microscopic study and comparison with the pericarps of similar fruits, were identified as consisting of the hulls, or outer layers of the pericarp, of the fruit of *Juglans regia*, or English walnuts. Professor Kraemer gives a description of the macroscopic and microscopic character of this material, consisting for the most part of the outer layers of the pericarp, i. e., the epicarp and sarcocarp, and points out the characteristic elements of the dark brown or blackish-brown powder produced from them, which are shown in illustration accompanying this paper.—Amer. Jour. Pharm., August, 1911, 377–381.

Rhus Michauxii—Apparently a Non-Poisonous Plant.—L. E. Warren, after a review of the literature concerning the poisonous properties of *Rhus Michauxii*, and pointing out some botanical corrections recently communicated by Prof. Wm. Trelease, Director of the Missouri Botanical Gardens, records the results of some experiments made with authentic specimens of various parts of this plant—small branches and leaf buds about to open, received in April, 1910, and part of an inflorescence, received in July, 1910. Alcoholic extracts were prepared from this material and tested by the method (slightly modified) described by Tschirch and Stevens (in Proceedings 1905, 318, and 1907, 811). This consists in thoroughly rubbing a drop of the suspected liquid into the integument of the forearm by means of a glass rod, thus covering a circular area about 1 Cm. in diameter, washing off with ether, then alcohol, then soap and water after 30 minutes, and noting the result, which in case of poisoning is noticeable redness, followed perhaps, after 24 to 36 hours, by slight itching. In the case of the alcoholic extracts from the above mentioned materials, the results in both cases were negative. While these observations and experiments do not absolutely prove *Rhus michauxii* to be innocuous, the author is of the opinion that further investigations will but furnish additional evidence in support of Curtis' contention, made 40 years ago, that the species is entirely harmless. This paper is supplemented by an extensive bibliography, concerning the very numerous papers on the subject of this and other species of *Rhus*, supposed or recognized to be

poisonous, from 1803 to the present year. An electrotype plate, showing the habit of *Rhus michauxii*, prefaces this paper.—Amer. Journ. Pharm., Nov., 1910, 499–507.

Japan Wax—Examination by "Alcoholysis".—E. Tassilly has examined Japan wax by "alcoholysis," a term which was used by Haller in 1906 to describe a new method for this purpose, which consists in treatment of the Japan wax with pure methyl alcohol and anhydrous ether. The operation is conducted thus: Japan wax, 450 Gms.; pure methyl alcohol, containing 2.5 per cent HCl, 570 Gms.; anhydrous ether, 800 Cc. After three hours' heating on the water-bath, solution is complete, but it is necessary to continue the heating for ten hours in order to convert the glycerides into ethers. The liquid loses its original yellow tint, to become deep red towards the end of the operation. The clear solution is treated with barium carbonate, filtered to separate the barium chloride formed and the excess of carbonate. The filtrate is now treated with a saturated solution of salt, which dissolves most of the methylene, leaving the ethers formed in the course of alcoholysis in solution in the supernatant liquid. This latter is dried over calcium chloride, and distilled. The solid mass thus obtained is submitted to fractional distillation *in vacuo* (under 12 Mm.) The various fractions have been examined by the author, who finds that palmitin and free palmitic acid are the chief constituents of Japan wax; in addition, however, there is japonic acid, $C_{14}H_{38}(CO_2H)_2$, and its two lower homologues, as well as very small quantities of soluble acids, among them probably isobutyric acid. He has also found pelargonic acid, an acid having the composition $C_{15}H_{30}O_2$, traces of stearic acid and oleic acid, but no arachidic acid. From the unsaponifiable matter, it is noted that melissic and cerylic alcohols, an alcohol, $C_{19}H_{40}O$, a phytosterin and an ill-defined body, have been extracted. The author thinks, however, that some of these bodies may have resulted from the treatment undergone by the original material.—Pharm. Journ. and Pharmacist, October 28, 1911, 561; from Bull. Soc. Chim. de France, June 20, 1911, 609.

PIPERACEÆ.

Cubebs—Naturally Occurring Substitutes.—William Mansfield has planned a series of papers in which he will consider the naturally occurring adulterants of the U. S. P. drugs. In the present paper he considers those of cubebs, consisting of cubeb stalks and partially grown fruits which compose the cubeb siftings. Cubeb dust is also a commercial article and is supposed to consist of broken pieces of cubebs; but this is not always so, as some samples prove upon examination to consist of coarsely powdered cubeb stalks, which are of very little value medicinally. The author gives a microscopic description and shows in cross section the microscopic features of the stalks, and in a second illustration the chief elements of the powdered stalks—the diagnostic elements of this powder being

(1), the conducting cells; (2) large rounded thin-walled porous stone cells; (3) the liquefied porous-walled pith cells; (4) the multicellular trichomes. A powder made from the small young fruit differs from the U. S. P. cubebs. In the first place the powder is much darker in color when viewed under the microscope, there is almost an entire absence of starch masses which are so characteristic of cubebs U. S. P., the predominating tissue being the dark brown epidermal cells and the group of hypodermal stone cells. There are fewer oil globules also in an alcohol, glycerin and water mount.—Proc. N. Y. State Pharm. Assoc., 1911, 248–253.

White Pepper—"What is it?"—Recent prosecutions for the sale of white pepper containing some husk, resulting sometimes in convictions in the North of England, has brought forth an interesting paper by Ernest J. Parry in which he very lucidly explains what is or may be regarded as being white pepper. He says that the fruits of the pepper plant, in their natural condition, as imported into this country, are of a dark, practically black, color. They are gathered directly the first signs of ripening are noticed. It appears to be the fact that when the fruits are full ripe, the greater portion of the pericarp is easily removed, and the ripe fruits deprived of most of the husk are the "white" peppercorns imported into this country. It is not possible to directly estimate the amount of husk. A determination of the fiber can be made, and deductions, more or less accurate, drawn from this determination. The fiber is determined as follows:

"Two grams of the finely powdered sample is boiled under a reflux condenser for thirty minutes with 200 Cc. of dilute sulphuric acid (2.5 Cc. of strong acid in 200 Cc. of water). It is then filtered, the insoluble matter washed with water, re-transferred to the boiling-flask, and boiled for thirty minutes with 200 Cc. of 1.25 per cent. solution of potassium hydroxide. The insoluble fibre is now filtered off, washed, dried and weighed. It is then ignited and the ash deducted from its weight."

Mr. Parry has examined numerous samples of both white and black peppercorns as imported, and obtained the following results of his analysis:

"Black peppercorns contain from 14 to 20 per cent. of fiber.

"White peppercorns (as imported) contain from 3 to 6 per cent. of fiber."

It is probable on such facts that prosecutions have been initiated. It appears to have been overlooked, however, that there is quite another white pepper on the market than that resulting from grinding the imported, partly decorticated peppercorns above mentioned. Or, if it has not been overlooked, then, in some cases at all events, trade rivalry must be assumed as the motive which instigated some at least of the earlier

prosecutions. Quite a number of the largest and most reputable spice-grinders prepare white pepper by decorticating to a greater or less extent the black peppercorns as imported. This requires extensive machinery, and all pepper-grinders do not possess it. In the manufacture of such white pepper, when the very palest variety is required, the whole of the pericarp is taken off, leaving nothing but a trace of the husk in the ground pepper. Where such pale varieties are not wanted more of the pericarp is left on, the outer or black husk being always stripped off. It is this class of pepper which has heen attacked. It has never been suggested that it contained anything but pepper, and the manufacturers claim, and rightly claim, to be entitled to grind just those portions of the peppercorn which will yield what is to the senses a white pepper—that is, a pepper of pale color. The percentage of fiber present in white pepper obviously varies according to the amount of pericarp left on, and is generally inversely proportional to the price. Mr. Parry has during the past three months examined 30 samples of white pepper obtained from various sources, and from the figures obtained, and other considerations, he regards it reasonable, if any standard (other than the requirement that it shall be pure pepper, and white to the senses) be demanded, that of Moor and Pearmain should be accepted—namely, in their own words:

"We may regard those samples as genuine which fulfill the following conditions:

"Black pepper, not exceeding 7.0 per cent. ash, 10 to 18 per cent. fiber.

"White pepper, not exceeding 3.0 per cent. ash, 3.5 to 9.5 per cent. fiber, providing that the microscopic appearance is normal."—Chem. and Drug., July 29, 1911, 167–168.

RHAMNACEÆ.

Condalia Spathulata—Proximate Examination of the Root and Stem.—T. M. Gentry and E. M. Reuss report the results of a proximate examination of a Mexican drug, identified to be the root and stems of *Condalia spathulata*, which is stated to be used by the Mexicans for the treatment of gonorrhœa. In the analysis the method of Dragendorff and Parsons—consecutive extraction by different hot solvents in a Soxhlet—was used with the following results: Petroleum ether extracted 0.45 per cent.; ether, 6.814 per cent.; chloroform, 3.674 per cent.; alcohol, 26.454 per cent.; water, 1.12 per cent.—the residue amounting to 60.5 per cent., and the loss 0.988 per cent. The following constituents were identified: Volatile oil (a trace); a bland fixed oil (small amount); a quantity of darkened resin (apparently of a glucosidal nature); a glucoside with well-marked saponin characteristics.—Proceed. Texas. Pharm. Assoc., 1910 108–110.

Rhamnus Catharticus and R. Purshiana.—Historical Notes.—Prof. John Uri Lloyd publishes some brief historical notes with particular reference to *Rhamnus purshiana* and its relation to buckthorn bark, *Rhamnus catharticus*. The latter plant is of wide distribution, prevailing over Northern Africa, most of Europe, the Caucasus, and into Siberia. It was known as a laxative before the Norman Conquest, being called "Waythorn" or "hartshorn"; and Welsh physicians of the thirteenth century prescribed the berries in the form of a syrup, with "Syrup of Buckthorn" as the title, which aromatized, became official under this name in the London Pharmacopœia of 1650. The official U. S. P. drug, *Rhamnus purshiana* is not only closely related botanically to the preceding drug, but is therapeutically similar, being laxative in small doses and cathartic in large doses. The tree is distributed over the mountain ranges of the Western Pacific States, most abundantly in California and Oregon, but it is possible that collectors of the bark, first introduced to notice in 1877 by Dr. J. H. Bundy, of Colusa, Cal., under the name of *Cascara Sagrada*, do not distinguish between the species *Rhamnus purshiana* and *R. californica*. The remarkable record of this drug has been the subject of many contributions to botanical and therapeutical literature, and much of interest even now remains unwritten. A descriptive treatise that will record some unwritten phases of the journey of this drug, familiar only to those concerned in its introduction, in its journey from the aborigines to scientific use and therapeutic study, should not be lost to posterity. Professor Lloyd appends a brief summary of a contribution made on this subject contributed by him in "Proceedings," 1896, to the Research Committee of this Association.—Pract. Drugg., May 1, 1911, 38.

Rhamnus Cathartica—Constituents of the Bark.—Introducing the subject of their recent researches on the constituents of the bark of *Rhamnus cathartica*, A. Tschirch and H. Bromberger mention that more than 60 years ago, Max Binswanger had determined the presence in this bark of the following constituents: An oil (colored green by chlorophyll), rhamnoxanthin, amorphous resin, tannin, crystallizable bitter principle, and sugar; but none of these bodies were definitely characterized. Since then (1898), Tschirch announced the presence of "Oxymethylanthraquinone" in this bark (compare also "Rhamnus Catharticus," Proceedings, 1901, 741). By their recent researches Tschirch and Bromberger have now isolated and definitely describe the following additional constituents: "*Rhamnosterin*," a nearly colorless body belonging to the phytosterins; "*Rhamnofluorin*," an ash-grey body, crystallizing in flat plates, and soluble in ammonia and alcohol with green-yellow fluorescence; "*Emodin*" (=Frangula-Emodin); "*Chrysophanol*" (=pure Chrysophanic acid); "*d-Glucose*;" and "*Tannic Acid*."—Arch. d. Pharm., *249* (1911), No. 3, 218–223.

EUPHORBIACEÆ.

Caoutchouc, B. P.—Suggestion for an Improved Method for Its Examination.—Pointing out the deficiencies of the B. P. monograph on caoutchouc—the prepared milk-juice of *Hevea brasiliensis*, and probably other species—known in commerce as Para rubber—Hermann C. T. Gardner states that the pure Para rubber of commerce is not completely "soluble" in the solvents given. Chemically pure caoutchouc, $C_{10}H_{16}$, does dissolve, or diffuse, but the commercial article leaves a residue, which no amount of time will cause to pass into solution. The reason for this is that it always contains more or less inorganic salts, convertible into ash, together with albuminous matters, all of which are insoluble in the reagents named. As the raw rubber on "coagulation" becomes admixed with other constituents of the latex, such as albuminous and resinous bodies, and as it is apt to be contaminated with extraneous foreign matters, such as earth, woody particles, etc., and, moreover, as the water may be imperfectly eliminated during curing, it is obviously essential that some limit should be set to the proportion of these things. The author therefore suggests, as the outcome of considerable experience, that the revisers of the Pharmacopœia would do well to affix definite limits for impurities, and should assign a maximum ash-percentage in the dry washed rubber. In actual practice he has found that the quantitative examination of rubber can be reduced to a simple procedure, which he describes in detail in the present paper—the analysis being made on small portions or sections from different parts of the cake, very finely sliced and mixed. The

Estimation of Water is made with 2 Gm. of the sliced rubber, placed dry in a specially constructed vacuum apparatus (figured in the original paper), consisting of a light wide-mouthed bottle. fitted through a rubber stopper with two bent glass tubes, one reaching to near the bottom, by means of which the air and moisture is exhausted with a pump—the vacuum bottle being heated in brine for four hours. The loss in weight effected by this treatment (the weight of the bottle being known) is determined by removing the tubes and stoppers from the well-wiped bottle, quickly placing it in a desiccator to cool and then weighing.

Ash.—About 0.5 Gm. of the rubber is incinerated in an open crucible, and the ash ascertained in the usual way.

Resins.—The resins of rubber are peculiar, the most suitable solvents being acetone or glacial acetic acid. As a rule, acetone will dissolve the resins of Para rubber. One Gm. of the dried rubber should be placed in a Soxhlet apparatus connected with a flask containing acetone and fitted with a reflux condenser. The acetone should be kept in ebullition, and at least two dozen runnings allowed. On completion, all that is necessary is to evaporate off the acetone and weigh the flask and resin, the weight of the flask having been previously ascertained. As the dried rubber was

taken, allowance must be made for the percentage of water in calculating the percentage of resins in the crude rubber.

Proteids.—About 0.5 of the raw rubber should be taken, and the nitrogen estimated either by Kjeldahl's or the soda-lime process. From the amount of nitrogen found the quantity of proteid may be deducted by multiplying with the factor 6.33, because rubber proteid is assumed to contain 15.8 per cent. of N, and $\frac{100}{15.8}=6.33$. A proportion sum will give the percentage.

Fine hard Para normally contains from 1.2 to 2.0 per cent. of resins and 0.2 to 0.7 per cent of ash. The amount of proteid usually ranges from 3 to 4 per cent., and the water anything from 5 to 10 per cent., or even more. Plantation Para, as a rule, contains much less water, say, from 0.75 to 3 per cent. A good rubber should contain at least 90 per cent. caoutchouc, though 95 per cent. or even 97 per cent. is not unusual in plantation samples.—Chem. & Drugg., Sept. 2, 1911, 52–53.

Caoutchouc—Synthetic Production, Chemical Composition and Properties.—Dr. W. Hinrichsen contributes an interesting review of the sources, methods of production, synthesis, chemistry and properties of caoutchouc. After a brief description of the process of preparing the so-called "Para-rubber" from the latex of *Hevea Braziliensis*, and mentioning that in other countries the latex from different plants is coagulatad by special methods and particularly by chemical reactions, with acids, the author explains that little is positively known concerning the actual processes that determine the formation of the coagulums. Presumably the caoutchouc pre-exists in the latex as a high-molecular product, and the coagulation simply causes a purely physical change of aggregation. The crude caoutchouc so obtained, freed from water-soluble and mechanical impurities by washing, constitutes when dried the "technically pure" caoutchouc of commerce and consists principally of a hydrocarbon, $C_{10}H_{16}$, but contains besides some mineral matters, albumin sugar and so-called resins. The constitution of the hydrocarbon was long an object of research and until very recently remained a puzzle; but the researches of Harries have now established its constitution definitely and its close relationship to *Isopren* (C_5H_8), a hydrocarbon which in former researches has been found with great uniformity among the products of decomposition of the caoutchouc hydrocarbon, and which has been noticed by Bouchardot to form a caoutchouc-like mass under certain conditions, has paved the way to its synthetic production. The constitution of the caoutchouc hydrocarbon (a dimethyl deviation of an eight-ringed carbon cycle with double bindings) having been determined, it became possible to build up from the hydrocarbon isopren, and the synthesis of the caoutchouc-hydrocarbon has recently been accomplished, first by F. Hoffman and then by Harries, by the condensation of isopren under certain described conditions. It remains to be

seen, however, whether this synthetic product has the properties that are demanded of natural caoutchouc for technical purposes. It is not known to what extent the most important technical properties of caoutchouc —vulcanizability and stability—depend upon the small quantities of impurity in natural caoutchouc; for it has been observed frequently, and particularly in the case of colloids, that the presence of the smallest quantities of other bodies in admixture appear to be absolutely necessary in order to develop the typical colloidal property. As is well known, crude caoutchouc is changed by the action of air and light, loses its elasticity and becomes hard and brittle. Its technically important property is acquired only by vulcanization—this resulting by treatment with sulphur, either at temperatures above the melting point of the latter (hot vulcanization) or by the action of sulphur chloride in solution (with carbon disulphide for example), at the ordinary temperature (cold vulcanization). One of the most interesting problems that remains to be solved, is the restoration of vulcanized rubber to its original condition—the removal of the sulphur, which has up to the present resisted all attempts of chemical research.—Pharm. Ztg. lv (1910), No. 78, 789; from D. Chem. Industr., 1910, Nos. 15 and 16.

Artificial Caoutchouc—Preparation.—It is stated that Dr. Pleinemann has succeeded in producing a body, by subjecting acetylene and æthylene to a red-heat, which on methylation with methylchloride is converted into isoprene. While the method has not yet been perfected technically, it is evident that with an unlimited supply of acetylene a cheaper material than oil of turpentine, from which isoprene has heretofore been prepared, is supplied for the artificial preparation of caoutchouc, which, as is well known, is obtained for the polymerization of isoprene.—Pharm. Ztg., lvi (1911), No. 12, 116.

URTICACEÆ.

Antiaris Toxicaria—A Second Glucosidal Constituent of the Latex.—In a previous investigation, H. Kiliani has shown the milky juice of *Antiaris toxicaria* to contain one glucoside, antiarin, $C_{27}H_{42}O_{10} + 4H_2O$, which on hydrolysis furnishes antiarigenin, $C_{21}H_{30}O_5$, and antiarose, $C_6H_{12}O_5$, a sugar allied to rhamnose. The author has now isolated another glucoside, *β-antiarin*, crystallizing in needles or columns, with three molecules of water, melting at 206–207° C., while the original *α*-antiarin crystallizes in tablets with four molecules of water, and melts at 220–225° C. The formula for antiarin requires further investigation. Results so far obtained point to $C_{27}H_{38}O_{10}$ or $C_{26}H_{40}O_{10}$ as being more likely, but this requires confirmation.—Pharm. Journ. and Pharmacist, March 18, 1911, 369; from Berichte, *43* (1910), 3574.

Cannabis Indica—U. S. P. Requirements.—W. A. Pearson remarks that

the Pharmacopœia plainly states that (at the time of gathering the tops: Rep.) the fruits of Indian cannabis should be undeveloped and the pistillate flowers mature, but unfertilized; yet a little latitude is apparently allowable, as the last sentence of the description states that "few or no pollen grains or stone cells should be present." As the author has never found shipments of this drug without developed seeds and in fact has never seen many flowering tops without one or more developed seeds at the base, the difficulty of complying strictly with the requirements of the Pharmacopœia can be realized. Knowing that the government has been cultivating Indian cannabis for its fiber, a letter was addressed to Dr. Lyster H. Dewey, botanist in charge of the Fiber Investigation Department of the United States Department of Agriculture, asking if the flowering tops could be of sufficient size to be collected on a commercial scale without obtaining any developed fruits. Dr. Dewey's reply, in part, is as follows: "Most of the commercial hemp drug is obtained from plants of the Smyrna type, or of the type growing in East India. The Smyrna type, as we have grown it in our experiments in this country, is usually earlier than the ordinary Kentucky hemp of recent Chinese origin. Furthermore, it has more dense clusters of seeds. It would he impossible to harvest these flower clusters, however, without having numerous mature seeds near the base, if one waited until the outer flowers began to develop. The period of flowering and fruiting lasts from four to eight weeks. The flower clusters in well developed plants are often eight inches or more in length and nearly two inches in diameter, made up of dense masses of flowers with seeds in various stages of growth and small crowded leaves.

"The plants which we have grown from seed received direct from India are very late in maturing, and some of them are imperfectly dioecious, that is, staminate and pistillate flowers are sometimes found on the same plants."

Mr. Pearson's correspondence with a number of persons who are considered authorities on the subject elicited replies which confirm the views expressed by Dr. Dewey, that it is impracticable to procure Cannabis Indica that fully meets the requirements of the U. S. P. He therefore holds that the Pharmacopœia should not give standards that cannot be commercially reached, and for this reason the next edition should specify the proportion of seeds allowable, and also, in order to insure uniform activity, state that a certain amount of the extractive should produce incoordination in a dog of a certain weight.—Amer. Drugg., October 24, 1910, 235.

Indian Hemp—Production in Greece.—L. Rosenthaler, reporting the result of a chemical comparison of Grecian cannabis indica with Indian hemp produced in India, says that the cultivation of Indian hemp in Greece is confined to a limited area in the neighborhood of Tripolitza, where in normal years from three to four million kilos of the herb are pro-

duced—the entire product being converted into hashish in Tripolitza itself during the months of December and January, in which months dry north winds prevail; the yield is about 10 per cent. The hashish is not used in Greece, but is exported, part to Europe and part, indirectly, to Egypt. A sample of Grecian hemp was examined in comparison with a sample of the Indian drug; the former gave 23.9 per cent. soluble in alcohol and the latter 21.2 per cent. The Grecian drug gave 0.390 per cent. of volatile substance, which absorbed 0.4344 of iodine; the Indian gave 0.316, which absorbed 0.3956 of iodine. Cannabinol was determined by distilling 25 Gms. in steam until 2 liters of distillate was collected, thoroughly extracting this with ether, drying the ethereal liquid with anhydrous sodium sulphate, and distilling off the ether; the residue was dried for twenty-four hours in a desiccator, weighed, and the amount of iodine which it would take up determined by the method of Messinger and Vortmann for the determination of phenol. The results of this investigation, although not conclusive as regards the relative activity of the two drugs, cannot be regarded as being unfavorable to the Grecian drug.—Apoth. Ztg., xxvi (1911), No. 65, 678.

Indian Hemp—Questionable Value of the Iodine Number.—The recent suggestion by D. Hooper (1908) of a method for the commercial valuation of Indian hemp products based upon the iodine value of the active constituent, cannabinol, has elicited an inquiry into the possible value of the method for the standardization of these preparations in place of the present physiological one, by C. R. Marshall and J. H. Wigner, constituting a Therapeutic Committee of the British Medical Association. The method, it seemed to them, would be of value for purposes of standardization only if the active principle (or some inert substance which always accompanies it in a fixed ratio and is not easily separated from it) gives a relatively high, and other substances not easily removable and pharmacologically inert a relatively low iodine value, or *vice versa*. If physiologically inert or almost inert substances possessing an iodine number approximating to that of the active principle occur in variable proportions in preparations of Indian hemp, the method is obviously of no value as a means of standardization. Unfortunately this appears to be the case. In order to reduce the sources of error, the authors decided to work with pure or approximately pure principles. They examined: (1) A sample of original cannabinol prepared by Wood, Spivey and Easterfield in 1897, which had been kept in a sealed tube for eleven years, and which when tested appeared to have lost little, if any, of its pharmacological activity; (2) the same cannabinol after oxidation by a current of dry air, a process which has been shown by one of the authors to diminish its pharmacological activity; (3) various fractions obtained by the distillation of an extract of the same charas from which the above cannabinol was prepared.

The following iodine values, as determined by Hübl's method, are typical of those obtained:

		Iodine Number.
Fractions obtained from 12 year-old charas.	Original cannabinol (strongly active)	189
	Original cannabinol (after oxidation)	184
	Lower terpene fraction	67
	Higher terpene fraction	180
	Residue after distilling off terpene (very slightly active)	196
	Fraction boiling at 280° to 300° C. at 15 Mm. Hg pressure (very slightly active)	147
	Fraction boiling at 280° to 300° C. at 15 Mm. Hg pressure (after oxidation)	229

The figures show that the very active sample of cannabinol gives a lower iodine number than similar and almost inert samples prepared from old charas; that the oxidation of cannabinol, although diminishing considerably the physiological activity, does not greatly lower the iodine value; and that the iodine number of the higher-boiling terpenes, which possess no characteristic cannabis effect, approximates closely to that of active cannabinol. The determination of the iodine number seems, therefore, to be of no certain value as a means of estimating the pharmacological activity of cannabis preparations, and, consequently, it cannot be used as a substitute for physiological standardization.—Pharm. Journ. and Pharmacist, June 3, 1911, 740.

Haschisch—Effects not Due to Cannabis Indica.—Dr. M. V. Ball has made some interesting researches into the literature referring to haschisch. Persons who fortified themselves with haschisch before going into battle were called assassins. The derivation of the word "assassin" is probably from "Hassa," to kill or exterminate, or from "Hassan," who was chief of a sect, or from "Sachs," king of kings! Preparations of the drug, such as ganja or bhang, were the drinks used preparatory to the performance of some feat of valor. A closer examination of the Indian preparations and the methods of their employment shows that in the East cannabis indica is never used alone, but always in a mixture; that it is used like tobacco, under the name of "Ganja" or "Charus;" or in a preparation resembling cider, under the name of "Bhang;" or in a confection called "Madjoun," which contains, among other things, opium, cantharides, and stramonium. From the evidence collected from various works it is clear that the deliriums, manias, dreams, and sexual excitations noted from time immemorial as accompanying the use of haschisch preparations, and which seldom, if ever, have been observed with the use of the pure medicinal extract of cannabis indica, are due to the stronger drugs—opium, hyoscyamus, etc., with which the mixtures in common use in the East are associated.—Pharm. Journ. and Pharmacist, Dec. 10, 1910, 699; from Therap. Gazette, Nov., 1910.

CUPULIFERÆ.

Cork—Chemical Nature and Constituents.—It is well known that cork contains a substance, suberin, which can be saponified with potassium hydroxide. From this solution, in addition to other fatty acids, *phellonic acid* can be isolated. This acid is, according to the author, a hydrocyclic substance. On oxidation the ring is broken and the aliphatic *phellogenic acid* or its isomer *isophellogenic acid* is obtained. In contradiction to other workers, M. von Schmidt now has shown that the portion of cork soluble in chloroform contains not only cerin but also glycerides of fatty acids, and that the true cork-substance is free from these substances. Investigations of the chemical nature of cork have shown that phellonic acid forms anhydrides, and these anhydrides are present in cork, along with polymers of liquid and solid fatty acids. On heating the crude fatty acids from cork, water is split off, and a product is obtained which is completely insoluble in indifferent solvents. The fatty acids thus changed are unaltered by further heat, they are impermeable to gases, and represent the true cork-substance. If filter paper or better, fine sawdust, is saturated with the fatty acids, and then heated to 140°, a substance is obtained which is indistinguishable from cork, except that the structure is absent. Besides phellonic acid, there appear to be three other fatty acids present in cork.—Pharm. Journ. and Pharmacist, April 1, 1911, 433; from Œsterr. Chem. Ztg., 1911, 21.

CONIFERÆ.

Coniferous Seeds—Characters of Their Fixed Oils.—C. Grimme remarks that, in view of the fact that the fatty oils from the seeds of some conifers are valuable constituents of lacquers and varnishes, on account of their great drying properties, it is a matter for surprise that very little has been published in regard to the characters of these oils. Examination of the oils from the seeds of nine different conifers gave the results recorded below. Eight of the species are European, while the ninth, *Pinus gerardiana*, from the East Indies, is an article of commerce. Omitting the tabulated statement of the constants determined by the author, which must be referred to in the abstract quoted, it may be stated that all the oils had strong drying properties—the other characters and yield being as follows:

1. *Pinus silvestris*, L. (*Pinus pinaster*, Ait.; *Pinus maritima*, DC.). Yield: 32.1 per cent. Very viscous, brownish-yellow; aromatic, turpentine like odor and taste.

2. *Pinus montana*, Mill. (*Pinus pumilio*, Haenke; *Pinus mughus*, Scop.). Yield: 29.6 per cent. Thick, yellow, showing a green opalescence in reflected light; aromatic turpentine-like odor and taste.

3. *Pinus cembra*, L. Yield: 35.7 per cent. Very viscous, yellow; aromatic odor and pleasant sweetish taste.

4. *Pinus picea*, L. (*Abies pectinata*, DC.; *Pinus abies*, Du Roi; *Abies alba*, Mill.; *Abies picea*, Lam.; *Abies taxifolia*, Desf.; *Abies vulgaris*, Poir; *Abies excelsa*, Lk.). Yield: 32.8 per cent. Brilliantly clear, brown-yellow; aromatic turpentine-like odor and taste.

5. *Pinus abies*, L. (*Picea vulgaris*, Lk.; *Abies excelsa*, DC.; *Pinus picea*, Du Roi; *Pinus excelsa*, Lam.). Yield: 31.6 per cent. Golden yellow; aromatic odor and taste.

6. *Pinus pinea*, L. Yield: 21.8 per cent. Thick, brown; pleasant odor and taste.

7. *Pinus Gerardiana*, Wall. Yield: 30.7 per cent. Very viscous, greenish-yellow; pleasant aromatic odor and taste.

8. *Cupressus sempervirens*, L. Yield: 10.8 per cent. Green, turbid at ordinary temperature from separation of crystals; characteristic aromatic odor and taste.

9. *Thuja occidentalis*, L. Yield: 15.0 per cent. Green, rather thick, slightly turbid at ordinary temperature; characteristic aromatic odor and taste.—Pharm. Journ. and Pharmacist, Oct. 14, 1911, 494; from Chem. Ztg., Aug. 29, 1911.

Coniferous Waxes—Constituents.—J. Bougault records the result of further investigations of coniferous waxes. In addition to juniperic and sabinic acids, previously found in the wax of

Juniperus sabina, the author suspected the presence of thapsic acid ($COOH(CH_2)_{14}COOH$), m. p. 124° C. This has now been definitely isolated and its identity established. It probably does not exist in the free state in the wax. Since the amount present is very small, not exceeding 1 per cent., and it is distinctly more soluble in alcohol than the etholides, it would be removed by the process of recrystallization were it in the free state. It is probably liberated by saponification from an impurity accompanying these etholides. Further investigation of the wax of

Thuja occidentalis has resulted in the identification of sabinic acid among the saponification products. The amount present is much smaller than that of the juniperic acid. The wax also contains a minute quantity of an acid with a melting-point above 100° C. This is probably thapsic acid.—Pharm. Journ. and Pharmacist, Mar. 18, 1911, 369; from Journ. de Pharm. et Chim., 1911, *3*, 101.

Accra Copal—Composition.—According to the investigations of M. Kahan about 54 per cent. of Accra copal is soluble in alcohol; 34 per cent. in benzol; 50 per cent. in ether; 42 per cent. in chloroform; 37 per cent. in acetone; 23 per cent. in toluol; 87 per cent. in pyridine. It dissolves readily in alcohol-ether; melts between 106–156° C.; acid value, direct, 121.8; indirect, 126.4; saponification value, cold, 133.4; hot, 140; iodine value, 58.54. The portion soluble in ether yielded about 11 per

cent. of acids to ammonium carbonate solution, from which *accracopalic acid*, $C_{21}H_{34}O_3$, was separated by means of its lead salt, as a white powder melting at 104–106° C. Sodium carbonate solution then removed another 13 per cent., separable into two acids; *α-accracopalolic acid*, $C_{18}H_{30}O_2$, melting between 152–155° C., with an insoluble lead salt; and *β-aceracopalolic acid*, $C_{19}H_{32}O_2$, melting at 144–148° C., with a soluble lead salt. Caustic potash solution then extracted 6 per cent. similarly separable by means of the lead salts into *α-accracopalenic acid*, $C_{10}H_{20}O_2$, melting at 142–146° C., with an insoluble lead salt; and *β-accracopalenic acid*, $C_{12}H_{20}O_6$, melting at 150–152° C., with a soluble lead compound. The alkali extracted residue gave 8 per cent. of essential oil to steam distillation, which boiled between 164–266° C.; the main fraction distilling at 250–257° C. The non-volatile residue consisted of *α-accracopaloresene*, $C_{15}H_{36}O_8$, melting at 178–180° C. The portion insoluble in ether, but dissolved in ether-alcohol, gave 51 per cent. to caustic potash solution. The portion insoluble in caustic potash solution is *β-accracopaloresene*, $C_{13}H_{26}O_6$, melting at 197–199° C, The portion soluble in that alkali was separable by means of boiling alcohol into two parts; one soluble, *accracopalenic acid*, $C_{14}H_{26}O_3$, a white powder melting at 122–124° C., and the other insoluble, *γ-accracopaloresene*, $C_{10}H_{20}O_3$, melting at 184–186° C.—Archiv. d. Pharm., *248* (1910), 443.

Actinostrobus Pyramidalis, Miq.—Yield and Properties of the Volatile Oil of the Leaves.—Baker and Smith state that the leaves of *Actinostrobus pyramidalis*, Miq. (*Callitris actinostrobus*, F. v. M.), a coniferous tree which occurs sporadically in western Australia, yielded, when distilled in July, 0.256 per cent. essential oil possessing the following properties: $d_{15°}$ 0.8726, a_D + 40.9° C., $n_{D19°}$ 1.4736, sap. v. 21.6 = 7.6 per cent. ester $CH_3COOC_{10}H_{17}$, sap. v. cold 19.81 = 6.93 per cent. ester $CH_3COOC_{10}H_{17}$, soluble in 4 vols. 90 per cent. alcohol. Upon distillation this oil proved to be a terpenic oil, containing almost exclusively d-*a*-pinene, which was identified from the usual derivatives. Limonene appears to be entirely wanting in the oil. In addition to d-*a*-pinene it contains geranyl acetate; the geraniol being ascertained by oxidation into citral.—Schimmel's Rep., April, 1911, 17; from "A Research on the Pines of Australia," Sydney, 1910, 291.

Agathis (Dammara) Robusta, C. Moore—Yield and Properties of the Volatile Oil from the Oleo-Resin.—Baker and Smith state that the coniferous tree, *Agathis (Dammara) robusta*, C. Moore, known as "Queensland Kauri" or "Dandathu Pine," which occurs on the coast of Queensland, yields a resin from which 11.64 per cent. of essential oil was recovered. The constants of the oil were as follows: $d^{16°}_{15°}$ 0.8629, a_D + 20.2° C., $n_{D16°}$ 1.4766. Upon fractionation scarcely anything was obtained except d-*a*-pinene (nitrosochloride, m. p. 108° C.; nitrolbenzyl-

amine, m. p. 123° to 124° C. The oil is practically identical with American turpentine oil, and may therefore be regarded as an excellent commercial product.—Schimmel's Rep., April, 1911, 18; from "A Research on the Pines of Australia," Sydney, 1910, 376.

Araucaria Cunninghamii, Ait.—Volatile Oils from the Leaves and Latex.—Baker and Smith have prepared and examined the oils from the leaves and from the latex of *Araucaria cunninghamii*, known as "Hoop," "Colonial" or "Morton Bay Pine," occurring on the northern coast of Australia, in N. S. Wales, and in Queensland.

The Oil from the Leaves, distilled in November in a yield of 0.005 per cent., had the constants: Sp. gr. at 20°, 0.8974; $n_{D20°}$, 1.4977; sap. no., 4.4 = 1.54 per cent., ester $CH_3COOC_{10}H_{17}$; insoluble in 10 vol. 90 per cent. alcohol. Apparently the oil consists of high boiling terpenes.

The Oil from the Latex, distilled in a yield of 3.8 per cent., had a faint odor of menthene: $d_{15°}^{22°}$ 0.8057, a_D + 31.2° $n_{D22°}$ 1.457. When the oil had been allowed to stand for about 10 months, a resinous precipitate had formed in the bottle, from which the oil was separated. This precipitate boiled at 154 to 155° (corr.): $d_{19°}$ 0.7929, a_D = 0, $n_{D19°}$ 1.4437. Analysis showed it to possess the formula $C_{10}H_{20}$. Found: C 85.77 per cent., H 14.15 per cent.; calc. as $C_{10}H_{20}$ C 85.71 per cent., H 14.29 per cent. The hydrocarbon is therefore a menthane. The original oil probably contained a menthene, from which, during keeping, a menthane had been formed. Acetic and butyric acids were found in the distillation water.—Schimmel's Rep., April, 1911, 21: from "A Research on the Pines of Australia," Sydney, 1910, 318.

Athrotaxis Selaginoides, Don.—Yield and Properties of the Oil from the Leaves.—Baker and Smith have distilled and examined the volatile oil of the leaves of *Athrotaxis selaginoides*, Don., known in Tasmania by the name of "King William Pine." It was obtained in July in a yield of 0.076 per cent., and had the following constants and properties: $d_{15°}^{16°}$ 0.8765, a_D + 74.8°, $n_{D16°}$ 1.4905, ester v. 8.6 = 3 per cent. ester $CH_3COOC_{10}H_{17}$. The oil was sparingly soluble in ordinary alcohol, but it dissolved in any proportion of absolute alcohol. Upon distillation it proved to consist almost entirely of d-limonene ($[a]_D$ + 112.2°; m. p of the tetrabromide 104°). Traces of pinene, and perhaps also of cadinene appeared to be present, as well as a phenol, possibly carvacrol.—Schimmel's Rep., April, 1911, 22; from "A Research on the Pines of Australia," Sydney, 1910, 303.

Benin Copal—Chemical Investigation.—W. Kahan finds that benin copal is fairly soluble in alcohol-ether; in alcohol alone about 60 per cent. is dissolved; in ether, 35.5 per cent.; in acetone, 35 per cent.; in benzol, 32 per cent.; in chloroform, 33 per cent.; in acetic acid, 41 per cent.;

in acetic ether, 44 per cent.; and in petroleum ether, 11 per cent. It sinters at 120° C., and melts at 166° C. Acid value, direct, 101.15; indirect, 118.75. Saponification value, after one hour, 149.8; after two hours, 146.3; after twenty-four hours, 134.4. The portion soluble in ether yields about 9 per cent. of acids to ammonium carbonate solution, from which *benincopalic acid*, $C_{17}H_{32}O_4$, was separated as a white powder, melting at 137° C. Sodium carbonate solution then removed about 25 per cent. of acids from the ether solution. The lead precipitates of these were separable into two acids by means of their different solubility in acetic acid: *α-benincopalolic acid*, $C_{13}H_{32}O_6$, a white powder melting at 81° C., soluble in acetic acid; and *β-benincopalolic acid*, $C_{20}H_{30}O_2$, a pale yellow powder melting at 119° C., insoluble in acetic acid. Weak potassium hydroxide then removed 6 per cent. of crude acids, of which *benincopalenic acid*, $C_{37}H_{48}O_3$, melting at 101° C., was separated. The residue after this successive extraction with alkalies yielded to steam distillation about 3 per cent. of colorless essential oil, boiling between 180–256° C. The non-volatile residue was composed of *α-benincopalresene*. The portion of the original copal insoluble in ether was then dissolved in ether-alcohol. This solution gave about 47 per cent. of acids to 1 per cent. potassium hydroxide solution. These were separable by means of their different solubility in boiling alcohol. The portion soluble in this hot solvent was further separated by means of lead acetate into *α-benincopalinic acid*, $C_{21}H_{30}O_3$, melting at 187° C., and forming an insoluble lead salt; and *β-benincopalinic acid*, $C_{15}H_{28}O_3$, melting at 193° C., and having a soluble lead salt. The portion insoluble in boiling alcohol consisted of *γ-benincopaloresene*, $C_{13}H_{26}O_4$, melting at 192–195° C., soluble in caustic potash solution, and *β-benincopaloresene*, $C_{12}H_{30}O_{10}$.—Arch. d. Pharm., *248* (1910), No. 6, 433.

Dacrydium Franklini, Hook—Yield and Properties of the Volatile Oil of the Leaves and of the Wood.—Baker and Smith obtained fsom the leaves of *Dacrydium Franklini*, Hook., a conifer restricted to Tasmania, where it is known as "Huon Pine," 0.5 per cent. of volatile oil having the following properties: Sp. grav. $\frac{17°}{15°}$ 0.8667, a_D + 20.5°, $n_{D25°}$ 1.4815, soluble in equal vols. and more of absolute alcohol. The oil was carefully and thoroughly fractionated, when it was found that it probably contained α-pinene (m. p. of the nitrosochloride 110° to 111° C.) and d-limonene (tetrabromide, m. p. 104° C.). The principal constituent of the oil is a hitherto unknown terpene, to which the authors have given the name of "dacrydene." This dacrydene boils at 165° to 166° C. (corr.) ($d_{22°}$ 0.8524, a_D + 12.3° C.; $n_{D22°}$ 1.4749) and yields a nitrosochloride, m. p. 120° to 121° C. Analysis gave the formula, $C_{10}H_{16}$; found C 88.14 per cent., H 11.65 per cent.; calc. for C 88.24 per cent., H 11.76 per cent. Upon brominating, during which hydrobromic acid was liberated, a body

was formed of which the analysis pointed to a tribromo-product. In addition, methyleugenol was shown to be present, and was identified by oxidation into veratric acid (m. p. 178° to 179° C.).

The dry wood yielded 0.56 per cent. of volatile oil consisting chiefly of methyleugenol, but no eugenol was discovered. The oil had the sp. gr. $\frac{18°}{15°}$ 1.035; a_D + 1.4; $n_{D23°}$ 1.5373; sap. valve, 3.1. The higher boiling fractions gave the color reactions of "cadinene."—Schimmel's Rep., April, 1911, 58; from "A Research on the Pines of Australia," Sydney, 1910, 397.

Juniperus Procera, Hochst—Examination of a Useful East African Cedar.—Schimmel & Co. recently received for examination a parcel of the wood of an East African species of cedar, of which large forests have been discovered in German East Africa, and which is apparently very suitable for pencil-making. According to Dr. Giessler this word was derived from *Juniperus procera*, Hochst, a tree which occurs in the mountains of Abyssinia and Usambara, as well as on the slopes of Kilimanjara and Kenia, growing at an altitude of from 4,500 to 9,000 feet, and in Usambara forming extensive forests. In its anatomical structure the wood bears a close resemblance to that of *Juniperus virginiana.*

The *Volatile Oil* was distilled from two kinds of raw material—shavings and short planks. *The oil from the shavings* (yield 3.2 per cent.) was a deep yellow liquid, had a distinct odor resembling vetiver, and gave the following constants: $d_{15°}$, 0.9876; $n_{D20°}$, 1.50893; acid val., 8.4; ester val., 8.4; ester val. after acetylation, 70. Soluble in 1.6 vols. and more of 80 per cent. alcohol, and in one-half its own vol. and more of 90 per cent. alcohol. *The oil from the short planks* (yield 3.24 per cent.) formed at ordinary temperature a semi-solid mass studded with crystals. When drained off from the crystals the oil gave the following constants: $d_{15°}$, 1.0289, $n_{D20°}$ 1.51011, acid v. 27.06, ester v. 7.93, ester v. after acetyl, 89.6. The oil was soluble in 2 vols. a. m. 80 per cent. and in one-half its own vol. 90 per cent. alcohol. The crystals consisted of cedar camphor. —Schimmel's Rep., Oct., 1911, 105–106.

Pherosphaera Fitzgeraldi, F. v. M.—Yield and Properties of the Volatile Oil from the Leaves.—Baker and Smith have distilled during February from the leaves of

Pherosphaera Fitzgeraldi, a conifer found in the mountains of N. S. Wales, 0.108 per cent. of a bright yellow volatile having the following constants: $d^{22°}_{15°}$ 0.8705, a_D + 15.1°, $n_{D23°}$ 1.4811, sap. v. 2.4 = 0.84 per cent., ester $CH_3COOC_{10}H_{17}$. The oil gave no clear solution with 10 vols. of 90 per cent. alcohol. When evaporated it left a residue which congealed in a crystalline form. The principal constituents of the thoroughly fractionated oil were found to be terpenes, the presence of the following being determined: d-*a*-pinene (m. p. of the nitrosochloride 108°),

cadinene (m. p. of the dihydrochloride 110°) and probably traces of limonene or dipentene. The oil furthermore contains an aldehyde-like body which the authors were unable to identify more closely.—Schimmel's Rep., April, 1911, 95; from "A Research on the Pines of Australia," Sydney, 1910, 410.

Phyllocladus Rhomboidalis, Rich—Yield of Oil from Leaves and its Characters.—Baker and Smith have obtained from the leaves, or rather the phylloclades of the "Celery Top Pine" (*Phyllocladus rhomboidalis*, Rich.) a tree occurring only in Tasmania, 0.215 per cent. of volatile oil when distilling them in July, which had the following constants: Sp. gr. at 15°, 0.8892; a_D, —12°3′; $n_{D16°}$, 1.4903; sap. val., 1.5. This oil dissolves badly in alcohol containing water, but forms a clear mixture with its own volume of absolute alcohol. Besides, 1 per cent. of alcohols, l-*a*-pinene and probably a sesquiterpene, it contains a colorless, crystalline hydrocarbon ($C_{20}H_{32}$), the chloroformic solution of which does not give the red color reaction with sulphuric acid that is characteristic of the terpen. Being formed, as the authors believe, from 2 mol. of pinene, it is regarded to be a dipentene, to which they have given the name of

Phyllocladene.—It melts at 95°, and has the opt. rot. + 16° 06′. It is hardly attacked by bichromate of potash, but reacts with chromic acid in acetic acid solution. It is soluble in concentrated sulphuric acid and is not attacked by neutral permanganate solution. Bromine is first absorbed in glacial acetic acid solution, but very soon begins to exert a substituting action. Phyllocladene, therefore, appears to be a saturated body.—Schimmel's Rep., April, 1911, 95, 96; from "A Research on the Pines of Australia," Sydney, 1910, 415.

Pinus Insularis, Endl.—Characters of the Oleoresin.—It is stated in the "Philipp. Journ. of Science" (*5* (1910), 229) that oil of turpentine and colophony, both identical with the corresponding products of American turpentine, may be obtained from the oleoresin of *Pinus Insularis*, Endl. The oil of turpentine, produced by distillation with steam, consists principally of ordinary pinene, while the colophony contains more than 90 per cent. of abietic acid.—Apoth. Ztg., xxv (1910), No. 90, 887.

Shellac—Analytical Methods of Determining Quality.—W. Vaubel observes that on account of the high price of shellac and the fact that considerable additions of other materials can be made without altering its obvious properties, it is particularly liable to be adulterated; the material principally used for this purpose is colophony resin, and others which have been reported are aloe resin, arsenic sulphide, and alcohol-soluble copal, while combinations of colophony with oleic acid and fatty oils, and of colophony with carbolic acid, have occurred as substitutes for shellac. The presence of colophony is shown qualitatively by the Storch-Morawski test, in which a drop of strong sulphuric acid is added to a solution of the

resin in acetic anhydride, when colophony gives a red-violet color; also by the addition of Wijs's solution (iodine monochloride) to a solution in glacial acetic acid and chloroform, when shellac gives no color, but colophony gives a red-brown tint, varying in depth according to the amount present, so that the test may be used colorimetrically. For quantitative determination of the colophony present the principal tests are the following: (1) Extraction with organic solvents; shellac is very little soluble in any organic solvent except alcohol, and extraction in a Soxhlet apparatus with chloroform, carbon tetrachloride, or benzol, removes the colophony. (2) Behavior to borax solution; 10 Gm. of the resin in fine powder is added to 200 Cc. of 10 per cent. borax solution, heated on a water-bath and frequently stirred, when shellac dissolves, but colophony does not; the insoluble portion is, therefore, washed, dried, and weighed, and afterwards examined qualitatively. (3) Determination of the acid value and saponification value. Although these values show a considerable range of variation for both shellac and colophony, the acid value of shellac is the lower and the saponification value the higher; consequently, the difference between these, or the ester value, is very much higher in the case of shellac than in the case of colophony. (4) Determination of the iodine-absorption value; this is very much higher for colophony than for shellac. Wijs's and Hübl's solutions have been used by different workers; in the latter case the resin is dissolved in alcohol and chloroform, but reaction occurs between the alcohol and the Hübl's solution, and Wijs's is regarded as better, the resin being dissolved in glacial acetic acid and chloroform. (5) Determination of the bromine-absorption value. This is regarded as a test of much utility, the figure being about 8 for shellac and about 120 for colophony. The resin to be tested is finely powdered, 5 Gm. of it added to 100 Cc. of chloroform or carbon tetrachloride in a stoppered flask of 300 to 400 Cc. capacity, and the whole well shaken for about half an hour; 100 Cc. of water, 20 Cc. of strong hydrochloric acid, and 10 Gm. of potassium bromide are next added, and a solution of potassium bromate (20 Gm. per liter) is then added, 1 Cc. at a time from a burette, shaking well after each addition; when the yellow color in the aqueous layer, due to the liberated bromine, no longer disappears on shaking, but remains after frequently agitating during half an hour, the end point is reached. If too much color is derived from the resin for the yellow color to be clearly seen, a drop of the liquid may be tested with starch-iodide paper.—Pharm. Journ. and Pharmacist, Dec. 31, 1910, 788; from Chem. Ztg., Sept. 20 and 22, 1910, 991 and 1008.

C. Animal Drugs and Products.

Axin—A New Mexican Lac.—H. Bourguillen calls attention to a Mexican lac derived from a hemipterous insect, *Llaveia axinus*. The new lac, which is called "Axin," when fresh has the consistence of butter, a

yellow color, a rancid odor, melts at 38° C., and is readily soluble in boiling alcohol and in ether; but it rapidly absorbs oxygen from the air, forming a hard brown substance, which is insoluble in both these solvents. Hoeffer has isolated a substance, axinin, from it, which yields axinic acid and glycerin on saponification. Axin is obtained by boiling the insects in water, purifying the fat which rises, and forming it into sticks or balls, which are wrapped in bamboo leaves. It forms an excellent varnish for lacquering woods and metals, like Japan lac.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 664; from Journ. de Phar. et Chim., 1910, *2*, 406.

Burnt Sponge—Constituents.—The charcoal obtained by the ignition of sponge without free access of air has had more or less application in medicine since before the discovery of iodine in 1811 by Courtois, and a tincture of such charcoal (Spongia Usta) still enters into homœopathic pharmacy. Recorded investigations into the constituents of burnt sponge have shown very different results, and it appears that the material found in commerce does vary considerably. Seven samples obtained by E. Richter from different sources contained from 0.31 to 0.81 per cent. of iodine, 7.92 to 22.16 per cent. of lime (CaO) as calcium carbonate, 1.05 to 2.21 per cent. of iron, and from 3.35 to 15.30 per cent. of sand. Tinctures prepared with 90 per cent. and 60 per cent. alcohol, and analyzed, showed that the latter was the more suitable for dissolving the principal constituents. The average amount of iodine in a number of samples of the tincture was 0.075 per cent.—Apoth. Ztg., xxvi (1911), No. 33, 317.

Cochineal—Composition of the Fatty Matter.—The fatty matter of cochineal, which Pelletier considered as formed of olein and stearin, and in which Lieberman, who, however, had only examined the solid portion, had found myristicin, is shown by Huerre to consist almost wholly of free fatty acids, the composition being: Oleic acid, 35 per cent.; linoleic acid, 8 per cent.; myristic acid, 57 per cent.—Pharm. Journ. and Pharmacist, July 15, 1911; from Journ. de Pharm. et Chim., June 16, 1911, 608.

Beeswax—Quick Method of Examination.—The following method of examining beeswax has been found very serviceable by Dr. Fred Klein for the quick determination of the presence of rosin, fatty acids and paraffin (or ceresin), the melting point, and the specific gravity:

Rosin.—A small sample of wax is treated with nitric acid, Sp. Gr. 1.3, or strong nitric acid diluted with about $\frac{1}{5}$ its volume of water, and heated for a few minutes. If the acid layer is colored darker than a lemon yellow, especially when a little alcohol has been added, rosin is certainly present.

Fatty Acids.—A small sample of wax is treated with a 10 per cent. sodium hydrate solution, and boiled for a few minutes. The liquid is then treated with hydrochloric acid. If fatty acids are present, flakes of the

insoluble acids can be filtered off and, furthermore, tests can be made with reagents such as Schultze's, Bellevier's, etc.

Paraffin, or Cerasin.—A small sample is saponified with alcoholic potash, the alcohol evaporated and glycerin added instead of alcohol. The glycerin solution is boiled and hot water is added. If clear, no paraffin or cerasin is present. If floccuent or turbid, either paraffin or cerasin is present.

Melting Point.—A test tube with thermometer and small piece of wax is slowly heated in a beaker filled with water and placed on water bath, or over direct fire. The melting point should be on an average between 61 and 64° C.

Specific Gravity.—About 200 Gm. of the wax is brought into a glass cylinder which stands in a vessel filled with hot water. The cylinder must be entirely surrounded by hot or better boiling water so that the temperature ranges between 80° and 100° C. A Westphal Mohr balance is most convenient for this determination. The Sp. Gr. at 80° C., is about 0.8356, at 98° to 100° C., 0.821 to 0.818. All these tests may not look to be satisfactory, but if we make the analysis we will find them sufficiently accurate, not more than twenty minutes being required to make the five different parts of the wax analysis.—Pract. Drugg., October, 1911, 37.

Wax—Method of Taking its Specific Gravity.—Dr. E. Richter recommends to form small globules of the wax for conveniently taking its specific gravity. These are produced by dropping the melted wax into a test tube filled to the top with alcohol warmed to 50° C. A preliminary test is made with ammonia water, in which the wax should just float or sink. The globule is then introduced into a mixture of 40.0 alcohol and 140.0 water—previously prepared—and alcohol is added in portions of 5 Cc. at a time until the globule just sinks; then water is added in the same way, until the globule again rises. Having ascertained the specific gravity of the two dilutions of alcohol, the mean of the two specific gravities is accepted as that of the wax under examination.—Apoth. Ztg., xxv (1911), No. 19, 187.

Wax Oil—Composition.—Th. Ekecrantz and E. Lundström have made an interesting investigation to determine the composition of wax oil, an obsolete preparation, which under the name *Oleum ceræ*, was formerly official in many of the European pharmacopœias and is still employed externally as a remedial agent. Practically nothing is known regarding its components, and the little that is published in the literature refers to a product that is obtained by dry distillation either from the beeswax direct or in admixture with indifferent substances—such as sand or brick dust, whereas the commercial wax oil is at the present time always prepared by the dry distillation of the wax with burnt lime. Obviously, the products obtained by the latter method must differ in composition from those ob-

tained by the direct distillation of the wax, and the authors therefore prepared the wax oil for their examination by subjecting beeswax of assured purity to distillation three times with twice its weight of lime, obtaining thus about 67.5 per cent. of a brown-yellow oil, which gradually congealed into a grey-yellow mass, interspersed with crystalline leaflets. This yielded when distilled with steam about 30 per cent. of a mobile, yellow-green liquid, of sp. gr. 0.7825, having pronouncedly the odor of the wax oil, and consisting of a mixture of saturated hydrocarbons. The portion of the wax oil not volatilized by the steam consisted preponderately of "nonokosan," $C_{29}H_{60}$, which is probably produced by the oxidation of the myricyl alcohol of the wax to the corresponding acid and the subsequent splitting-off of carbon dioxide. The valuation of a sample of wax oil may properly depend on the following constants: Specific gravity, 0.790 to 0.792; acid number, between 8 and 12; iodine number, between 80 and 90.—Archiv. d. Pharm., 248 (1910), No. 7, 500–513.

Propolis—Production, Characters, Composition, etc.—M. Kistenmacher contributes an interesting and comprehensive study of propolis (bee-bread) which, almost completely forgotten as a remedy, has in recent years again attracted attention. He describes its significance in the hive, the method of its production by the bees from the oil or balsam on the surface of pollen grains, its influence on the construction of the honey comb, its properties, composition, etc. In the fresh condition, propolis is a very soft mass, possessing strong adhesive power, a strongly aromatic odor, a bitter taste, and varies in color from greenish-yellow to liver-brown. The older bee-bread, containing waxy and refuse matters, etc., usually has a darker color and is less adhesive. The propolis or bee-bread of commerce contains comparatively only a small percentage of solid matter, its composition depending upon the work of the bees themselves as well as the method of the collection by the bee-keeper. It is mainly composed of an oil or balsam—the so-called propolis balsam—which in turn is composed of cinnamic alcohol, cinnamic acid, tannins and resins.—Pharm. Ztg., lvi (1911), No. 13, 128; from Ber. d. D. Pharm. Ges., 1911, No. 1.

Propolis (Bees'-Resin)—Properties.—Supplementing his own observations and those of Bohrisch (see Proceedings, 1908, 256), K. Dieterich contributes an interesting investigation of bees' resin (propolis) in which he compares the commercial article with that of his personal collection, and on the basis of his observations suggests the following properties applicable to a satisfactory commercial product:

1. The ash should not exceed 2 per cent.

2. The aqueous extract should have a strong aromatic odor and strongly opalescent, and should amount to about 5 or 6 per cent.

3. The content of *crude-resin* should be quite small, while that of *pure propolis resin* and of *propolis-balsam* should be high.

4. The insoluble residue, after treatment with various solvents, should be small—at most not more than 13 to 14 per cent.—nor should these residues contain any metallic or other weighting material.

Referring to the original for the details of the methods of examination employed by the author, it may be stated that further investigations of the propolis-resin are in progress and will shortly be published.—Pharm. Ztg., lv (1910), No. 76, 771.

Honey—Method of Examination.—Dr. Fred Klein recommends a method for the examination which is quick and satisfactory. It comprises taking the specific gravity, which should be about 1.40 (1.439–1.450), ascertaining that it has a satisfactory odor and taste which should be aromatic and agreeable, and that it should respond to certain tests by which the natural sugar of honey may be differentiated from cane sugar and from corn sugar. The reagents consist: (1) of Fehling's solution; (2) Copper sulphate with excess of ammonium hydroxide to redissolve copper hydroxide; and (3) of copper oxide treated with hydrogen dioxide. With these the following reactions are obtained:

Fehling's Solution: Readily reduced by *honey;* no reduction by *cane sugar,* but partial reduction after boiling; readily reduced by *corn sugar.*

Ammoniacal Copper Sulphate ($CuSO_3 + 5H_2O + NH_4OH$—5 per cent. or 10 per cent.): Partial reduction with precipitate by *honey;* deep blue coloration, gradually losing clearness, by *cane sugar;* deep blue color and no change, by *corn sugar.*

Copper Oxide and H_2O_2 ($Cu_2O + H_2O_2$): After boiling, odor like caramel, with evolution of oxygen, by *honey;* after boiling no odor of caramel, by *cane sugar;* after boiling no odor, discoloration with H_2O_2 and slight evolution of oxygen, by *corn sugar.*—Pract. Drugg., October, 1911, 37.

Honey—Rapidity of Inversion of Cane-Sugar by Bees.—A. Korndoerfer observes that the nectar of flowers consists principally of cane-sugar, which, when it is collected by bees and placed in their honey bags, undergoes inversion and is then deposited in the cells of the comb. To study this change more exactly, the author placed two colonies of bees, in autumn, in empty combs and supplied them with a 50 per cent. solution of cane-sugar. After half an hour sufficient had been taken by the bees to be extracted from the comb and examined; it was then found to contain 42 to 44 per cent. of invert sugar, showing that in passing once through the honey bags four-fifths of it had been inverted. Observation showed that bees took two minutes to fill their honey bags and an equal time to empty them into the cell, and this large amount of chemical change occurs in that short time.—Apoth. Ztg., xxvi (1911) No. 64, 659.

Commercial Honey—Detection of Invert Sugar.—Commercial honeys are generally mixtures prepared by mixing together specimens derived

from different sources, which are melted over the naked fire in pans of great size, thus affording conditions favorable for the production of furfurol. H. Guantin states that in such cases Fiehe's reaction and the coloration of aniline acetate, which indicate the presence of furfurol, do not at all prove the addition of invert sugar. The experiments in the present instance were made with aniline acetate in preference to Fiehe's reagent, which is less decisive. The tests were made by shaking carefully 20 Gms. of the honey, diluted with distilled water, with a quantity of ether sufficient to yield, after three shakings, about 50 Cc. of ethereal liquid, which is allowed to evaporate spontaneously. For qualitative purposes the residue is treated with 2 or 3 drops of glacial acetic acid, and then 2 drops of colorless aniline. If quantitative results are desired the residue left by the ether is dissolved in 15 Cc. of alcohol (50 per cent.), free from furfurol, the alcoholic solution being then examined exactly in the same way as for furfurol in alcohol.—The author concludes from his experiments (1) that the presence of furfurol in honey prepared by expression or straining at ordinary temperature indicate the presence of foreign matter; (2) that the presence of furfurol in honey, which has been prepared by heating, is no positive proof of the addition of invert sugar.—Pharm. Journ. and Pharmacist, Oct. 29, 1910, 517; from Ann. de Chim. Analyt., Aug. 15, 1910, 299.

Honey—Manganese a Constituent.—Having observed that the ash of honey was frequently of a strong green color, due to manganese, A. Gottfried determined the amount of this metal in a number of samples by Marshall's colorimetric method as follows: 25 Gm. of honey was incinerated, the ash taken up with hot dilute nitric acid, silver nitrate and ammonium persulphate added, and the red color produced was then compared with known quantities of permanganate solution. Twenty five samples of honey were examined, and the manganese was found to be from 0.04 Mgm. to 4.4 Mgm. per cent. The quantity of manganese was not proportional to the ash, but showed some parallelism to the amount of nitrogenous matter, which suggests that, like the latter, it may have been derived from the bees and not from the plants yielding the honey.—Pharm. Zentralh., lii (1911), No. 30, 788.

Seal Oil—Similarity to Cod-Liver Oil.—An investigation of the properties of seal oil by A. Wingard showed that it is very similar in nearly every respect to cod-liver oil, while possessing less taste and smell; and practical trials indicated that it was equally valuable as a nutrient. The solidifying point, specific gravity, and viscosity, the acid, saponification, ester, Hehner, Reichert-Meissl, and acetyl values, and the content of glycerol, phosphorus, and iodine, are practically identical for the two oils, as well as the ratio between solid and liquid fatty acids. Small differences exist in regard to the Valenta figure, barium figure, and cholesterol con-

tent. The chief difference was found to be in the percentage of unsaturated fatty acids, of which seal oil contains a larger proportion than cod-liver oil, as shown by the refractive index, the iodine and bromine absorption values, the Maumené figure, and the auto-oxidation. There appears no reason why seal oil should not come to be used in the same way as cod-liver oil, and large supplies could probably be made available if the demand existed.—Pharm. Journ. and Pharmacist, Aug. 12, 1911, 231; from Svensk. Farmaceut. Tidsskr., 1910, Nos. 10 and 11.

Civet—Tests of Normal Quality.—Having examined four samples of civet in the manner described by Hébert on a previous occasion (see Proceedings, 1903, 815–816), E. Charabot and A. Hébert came to the conclusion that civet of normal quality should respond to the following requirements: When dissolved in a mixture of alcohol and ether less than 6 per cent. residue should remain. The saponification number of civet should exceed 100, and the fatty acids which are separated from the saponified civet after acidulation with sulphuric acid should exceed 50 per cent. Of the four samples under examination three answered these tests.—Schimmel's Rep., Oct., 1910, 150; from Bull. Soc. Chim. iv, 7 (1910), 687.

INORGANIC CHEMISTRY.

General Subjects.

Periodicity of Properties of the Elements—New Arrangement.—In a paper read before the Brit. Pharm. Conference 1910, J. F. Tocher observes that, although Mendeléeff's classification of the elements is admittedly an empirical one, Mendeléeff holds the field until physicists give us a classification on a theoretical basis completely descriptive of the periodic properties of the elements. The author therefore describes a modification of Mendeléeff's arrangement which may ultimately prove to have a satisfactory theoretical basis, and which, as a practical result, places elements of like properties in similar positions, while elements with unlike properties are separated by distances proportional to the intensities of their differences—these being ocularly demonstrated by a model showing (in illustration) the new arrangement of the elements.—Trans. Brit. Pharm. Confer. (Year-book of Pharmacy) 1910, 395–397.

Metals—Boiling Points.—H. C. Greenwood has determined the boiling points of the following metals: Copper, 2310°; tin, 2275°; silver, 1955°; lead, 1525°; bismuth, 1440°; antimony, 1420°; magnesium, 1120°.—Chem. News, July 21, 1911, 31.

Colloid Precipitates—Improved Method of Collection.—In making rapid determination of tin, M. Liebshutz has had much trouble in precipitating the metastannic acid (obtained in heating drillings in dilute nitric acid) from passing through the filters. The difficulty was got over successfully by adding to the colloidal metastannic acid suspended in the solution a dilute solution of albumin, and heating for a short time. The albumin coagulating carries down the tin as a curd, which can be filtered off at once. Any copper retained by the metastannic acid is got rid of by washing the precipitate of tin and albumin back into the beaker, and boiling for a short time with dilute nitric acid. For the rapid separation of zinc from copper when separating zinc by the cyanide method, the solution in which the gelatinous zinc sulphide is suspended is treated with a few drops of solution of lead acetate; the lead sulphide thus formed carries down the zinc sulphide, and the filtration may be effected at once. The mixture of zinc and lead sulphides is then treated with dilute hydrochloric acid, boiled for a short time, and zinc titrated as usual by potassium ferrocyanide. The albumin method first mentioned could doubtless be used advantageously for the coagulation of other precipitates.—Chem. News, Oct. 28, 1910, 213.

Colloidal Metallic Compounds—Preparation for Medicinal Uses.—According to K. Roth, colloidal metallic compounds, which are not attacked by the acids of the stomach, and are therefore suitable for administration when it is desired that they shall only act after reaching the intestine, may be prepared by mixing solutions of metallic salts, alkali resinates, and such reducing agents as hydroxylamine, formaldehyde, etc.; colloidal solutions are thus obtained from which acids precipitate absorption-compounds, and the latter are soluble in alkalies, and hence suitable for use in the circumstances referred to. The following is given as an example:—50 parts of sodium copaivate are dissolved in water, mixed with a solution of 75 parts of silver nitrate, and then with 37.5 parts of 85 to to 88 per cent. potash, and 29.5 parts of hydroxylamine; after warming on a water-bath till reduction is complete, the mixture is fully precipitated by acetic or a dilute mineral acid, the precipitate collected and washed until the washings are free from nitrate, and then dried.—Pharm. Journ. and Pharmacist, Aug. 5, 1911, 201; from Apoth. Ztg., xxvi (1911), No. 53, 533.

OXYGEN

Ozone—Generation by a Chemical Method.—T. Malaguin has made an addition to the small number of purely chemical processes by means of which ozone may be generated. When ammonium persulphate, is heated on the water-bath with nitric acid, specific gravity 1.310, reaction takes place rapidly at 65 to 75° C. with evolution of gas. The gas is found to consist of 3 or 4 per cent. of ozone, 4 to 4.5 per cent. of nitrogen, less

than 1 per cent. of carbon dioxide, and the rest oxygen. Gas is evolved very slowly at the normal temperature of the laboratory; and more rapidly at 50 to 60° C., but with considerable rapidity at the temperature above indicated. The author has devised, and figures, a special apparatus, wholly of glass, for the generation of ozone by this process. Although the yield of ozone is not very high, the method affords a convenient means for its production. The persulphates of potassium and of sodium do not appear to yield so much ozone with nitric acid as the ammonium salt.—Pharm. Journ. and Pharmacist, May 6, 1911, 587; from Journ. de Pharm. et Chim., 1911, *3*, 323.

HYDROGEN

Hydrogen—Sensitive Test.—C. Zenghelis observes that the detection of free hydrogen by combustion and conversion into water is neither delicate nor speedy, and is open to the further objection that the reaction is given by gaseous compounds of hydrogen. The best test is by means of a dilute solution of sodium molybdate. This reagent has already been proved by the author to be a sensitive test for tin, molybdenum blue being formed in presence of so small a quantity of tin as 0.000001 Gm. The same reaction takes place with nascent and occluded hydrogen. For the detection of free hydrogen, the gas is washed with sodium hydroxide solution to remove sulphuric acid or sulphuretted hydrogen, and then passed through a few Cc. of warm molybdate solution. The gas is passed in through a glass tube round which is wound thin, carefully ignited, platinum foil or gauze. A few bubbles of hydrogen are sufficient to produce a dark blue color. The reagent is prepared by dissolving 1 Gm. of molybdenum trioxide in dilute sodium hydroxide solution, making faintly acid with hydrochloric acid, and diluting to 200 Cc. with water.—Pharm. Journ. and Pharmacist, Mar. 11, 1911, 333; from Ztschr. Analyt. Chem., *49* (1910), 729.

Water Analysis—Interpretation of Reports.—J. E. Purvis observes that it is impossible to fix any standard by which waters can be judged and condemned. It is not sufficient to judge each item of an analysis either by itself or compared with some standard; nor is it sufficient to compare each item with the other items, because what might be satisfactory in one water might be condemned in another. The author cites the results of two analyses by way of illustration. In the one the albuminoid ammonia, the chlorine and the oxygen absorbed indicate some contamination, but the bacterial analysis gives a low figure; yet this water is supplied to a large town, and is considered to be a good water. In the other case, the albuminoid ammonia, the chlorine and oxygen-absorbed figures are all high, and would indicate pollution; yet this water was bacterially pure, and it could not be condemned as a bad water for drinking purposes. Other analyses could be given which would prove that no final judgment can be given either on the result of the chemical analysis, or in some instances

even on bacterial analysis—the latter depending on the type of bacteria found in the water. The author points out the conditions necessary and the rules that should be observed before a final judgment can be delivered on any water. But danger to health may arise both from hard and soft water, which are free from organic (bacterial) impurities, although in these cases the results of the chemical analysis are probably complete and final.—Trans. Br. Pharm. Conf. (Year-book of Pharmacy), 1910, 362–364.

Water—Detection of Free Carbonic Acid.—According to J. Tillmans and O. Heublein, accurate results are obtained by the titration of the carbonic acid with lime water or other alkalies, using phenolpthalein as indicator, if special precautions are taken to prevent loss of carbon dioxide. The sulphates, chlorides, nitrates, and bicarbonates of the alkalies and alkaline earths are neutral towards this indicator. The nitrates, chlorides, and sulphates are neutral to rosolic acid, but the bicarbonates react strongly alkaline with this indicator. One Mgm. of bicarbonate-carbonic acid neutralizes the acid reaction of 0.25 Mgm. of free carbonic acid. Large quantities of free carbonic acid may, therefore, escape detection by Pettenkofer's rosolic acid test, if considerable quantities of bicarbonate are present. Titration of the free carbonic acid with alkali or borax solutions, using rosolic acid as indicator, gives results which are too low, the error increasing as the quantity of bicarbonate present increases.—Pharm. Journ. and Pharmacist, March 11, 1911, 333; from Ztschr. f. Unters. d. Nahr. u Genuss., *20*, 1910, 617.

Water—Clarification in Presence of Much Suspended Matter.—Prof. Charitschkoff objects to the very prevalent use of alum for clearing turbid waters, since it raises the amount of sulphates and of dry residue. He recommends, instead, calcium permanganate, which acts by oxidizing, and at the same time precipitating and coagulating iron, aluminium, and magnesium salts, and also sterilizes the water. A water containing 6 per cent. of suspended matter, which required a large amount of alum for its clarification, was quickly and completely clarified by means of calcium permanganate, added in the proportion of 0.01 Gm. to the liter.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 664; from Chem. Ztg., Nov. 5, 1910, 1175.

Water—Removal of Iron for Industrial Use.—According to C. Hungerford, the method of aeration for the removal of iron from water, followed by filtration, is not always effective; the small proportions of organic matter in the water form certain indefinite compounds with the iron and cause it to resist the oxidizing influence of the atmosphere, with the result that the iron and organic matter together pass through the filter. The author finds the most efficient method to consist in treatment with lime, by means of which the quantity of iron can be reduced to less than 0.2

part in a million parts of water. The iron is immediately precipitated as hydroxide, and this in turn is converted into sesquioxide, which can be removed by filtration through sand. Water so treated is not appreciably hardened and the trace of iron remaining cannot cause any trouble in dyeing or bleaching processes.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 664; from Munic. Journ. and Eng., xxix, 10, through Journ. Roy. Inst. Pub. Health, Nov., 1910, 696.

Pure (Medicinal) Hydrogen Dioxide—Manufacture.—Otto Schmatolla gives an interesting description of the production of pure medicinal hydrogen dioxide by a simple method followed in industrial chemistry. The material for this purpose is commercial barium peroxide, which is produced in large quantities from the natural carbonate (witherite) and is valued according to the percentage of BaO_2, of which it usually contains from 85 to 90 per cent., with from 3 to 5 per cent. of barium oxide and carbonate, the remaining components consisting of silica, alumina, ferric oxide, and coke—the latter introduced during the process of manufacture. From this impure product the pure barium peroxide is obtained in the form of hydrate by first washing the material with water which removes the barium oxide as hydrate, while the barium peroxide remains practically intact. This is then converted into barium peroxide hydrate, and freed from associated impurities—particularly iron and silica—by dissolving it in HCl of 10–12 per cent. (carefully cooling), whereby a very stable neutral solution of barium peroxychloride is formed according to the equation: $BaO_2 + 3HCl = H_2O + Ba.O.Cl_2$. The neutrality of the solution is readily controlled by means of congo paper, which gives a sharp reaction. To remove the contaminating metallic oxides, a small quantity of barium hydroxide solution is added to the neutral solution before filtration. The filtered solution is then treated with 10–20 per cent. solution of NaOH, which must be as free as possible from carbonate, and barium peroxide hydrate is then obtained as a crumbly voluminous precipitate from which the chloride is readily removed by washing with pure (CO_2-free) water. In a moist condition, after expression, it contains about 35–38 per cent. of anhydrous BaO_2, corresponding to 7–8 per cent. H_2O_2—1 part yielding to decomposition with 0.20 to 0.22 parts H_2SO_4, about 2.3 to 3 parts of official (2.5 to 3 per cent.) hydrogen dioxide.

Inasmuch as barium peroxide hydrate is easily and accurately titrated with HCl and congo-red, the exact quantity of H_2SO_4 required for its decomposition is preliminarily determined. The decomposition of the peroxide is effected by gradually adding it to the 12 per cent. acid, carefully refrigerated, preferably by the addition of some ice, the last trace of H_2SO_4 being removed by means of a very little freshly precipitated barium carbonate. More concentrated solutions of H_2O_2 are obtained by doubling the peroxide and using a more concentrated acid, which yields a 5 to 6 per cent. H_2O_2, then using this to dilute the sulphuric acid for the next

decomposition. In this way a 10 per cent. (=30 vol. per cent.) hydrogen dioxide may be obtained. To obtain a yet stronger preparation (30 per cent. = 100 vol. per cent.), distillation in a vacuum at a moderate heat is resorted to.—Pharm. Ztg., lv (1910), No. 88, 888.

Hydrogen Dioxide—Chlorine-like Odor of Solutions Not Due to Chlorine.—The statement of Dr. Langensieper that solutions of hydrogen dioxide frequently contain appreciable quantities of chloride and of free chlorine—the latter usually perceptible to the smell—has induced Dr. R. Firbas, who had occasionally noticed an odor reminding of chlorine, to undertake a series of experiments in order to determine free chlorine if present in hydrogen dioxide solutions. His results were in the negative. Carbonic acid passed through hydrogen dioxide solution having a pronounced chlorine-like odor, did not have the slightest effect upon a solution of iodide of potassium and starch. Chlorine-odorous hydrogen dioxide solution when poured upon a silver foil produced copious evolution of gas and the metallic surface immediately became browned by the formation of silver oxide—an effect similar to that of ozone on certain metals—while with non-odorous H_2O_2 solution the browning of the silver foil was faintly perceptible only after several minutes' exposure. These experiments demonstrate with certainty that the peculiar chlorine-like odor is not attributable to the presence of free chlorine in solutions of hydrogen dioxide.—Pharm. Ztg., lv (1910), No. 99, 998; from Pharm. Post. 1910, No. 85.

Medicinal Hydrogen Dioxide.—Its quality, as at present found on the market, is the subject of a paper by Lyman F. Kebler, which appears in "Proceedings," 1910, 903–911.

Hydrogen Peroxide—Decomposition by Light.—Tian observes that it is well known that the decomposition of hydrogen peroxide by heat is a bimolecular reaction, while the rate of decomposition in presence of various catalytic agents follows the logarithmic law of a monomolecular reaction. The author has investigated the decomposition of hydrogen peroxide under the influence of the ultra-violet rays of a 220-volt mercury-quartz lamp using a current of 3.5 amperes, and finds that in very dilute solutions the reaction is of the first order. In concentrated solutions the rate of decomposition apparently falls off, the explanation being that concentrated solutions show marked absorption of ultra-violet rays, so that the molecules are not all exposed to equally strong illumination. The decomposition of hydrogen peroxide by light is thus a monomolecular reaction, and cannot be expressed by the equation $2H_2O_2 = 2H_2O + O_2$. It must be regarded as the sum of the two changes indicated by the equations $H_2O_2 = H_2O + O$ and $2O = O_2$.—Pharm. Journ. and Pharmacist, March 11, 1911, 333; from Compt. rend. *151* (1910), 1040.

Hydrogen Dioxide—A New Reaction for its Detection.—O. v. Sobbe

describes a new test for the detection of hydrogen dioxide, which is more sensitive than the color-reaction obtained by means of iod zinc starch solution. The test depends on the characteristic gray precipitate, insoluble in hydrochloric acid, which is produced by ammoniacal silver nitrate in dilute solutions of H_2O_2, and is so sensitive that a distinct precipitate is recognizable in an aliquot part of water to 100 Cc. of which 3 drops of a 3 per cent. solution of hydrogen dioxide has been added. This, however, appears to be the limit, since the test is not available with 1 or 2 drops of H_2O_2 solution treated in the same way. The reaction is more distinct in the presence of 4 to 5 drops and quite characteristic, while the color-test referred to is not available with less than 5 drops of 3 per cent. H_2O_2 in 100 Cc. of water.—Pharm. Ztg., lvi (1911), 736; from Chem. Ztg., 1911, No. 98.

Solution of Hydrogen Dioxide—Detection of Acidity.—In a series of comparative tests, the acidity of hydrogen dioxide solution was determined by Otto Stockinger: (1) to the U. S. P. method, and (2) by a modification of the same, omitting the evaporation (to 10 Cc.) of 25 Cc. of the solution after adding an excess of $\frac{N}{10}$ KOH, and at once titrating the excess of alkali in the cold with $\frac{N}{10}$ H_2SO_4. By the U. S. P. method, the acidity of the H_2O_2 samples ranged from 2.52 to 3.82 Cc. $\frac{N}{10}$ KOH, and concordant results could not be obtained, whereas by the modified (cold) method, it ranged from 1.2 to 1.53 $\frac{N}{10}$ KOH, which the author regards as more nearly indicative of the real excess of irritating acid, and excellently concordant results were obtained.—Proc. Pa. Pharm. Assoc., 1911, 310.

Hydrogen Dioxide—Improvement of the Cobalt Test.—Schmatolla and others have recorded a color test for hydrogen peroxide by means of cobalt nitrate; but the delicacy of the test is greatly increased, according to Leuchter, if it is carried out in the following way, and it will then detect a smaller quantity of peroxide than is shown by any other test that has been recorded: Two liquids are prepared, the first being a 1 per cent. solution of crystalline cobaltous chloride, $CoCl_2$, $6H_2O$, and the other consisting of 1.6 parts of borax, 20 parts of glycerin, and 100 parts of water, and equal parts (by weight) of these are mixed; the glycerin serves the double purpose of giving a sufficiently high density and preventing the formation of a flocculent precipitate by reaction between the borax and cobalt chloride. To 1 or 2 Cc. of the mixed liquid in a narrow test-tube a small quantity of the liquid to be tested is added, so as form a separate upper layer. If hydrogen peroxide is present, there appears in a shorter or longer time a brownish to blackish-brown zone, which gradually spreads into the upper layer, and then sinks to the bottom; if much peroxide is present, gas is evolved. One drop of the usual 3 per cent (i. e., 10 volume) solution of hydrogen peroxide was added to 100 Cc. of water, and 1 Cc. of this liquid was found to give the above reaction. Perborate gives

a similar result, and 1 Cc. of a 0.05 per cent. solution of sodium perborate was found sufficient to show it. Persulphates, however, do not give the reaction in the cold, even on standing an hour; but if the liquid is warmed, or if caustic alkali is added, the colored zone quickly appears.—Pharm. Journ. and Pharmacist, Nov. 18, 1911, 667; from Chem. Ztg., Oct. 5, 1911, 1111.

HALOGENS.

Anhydrous Metallic Chlorides—General Method of Preparation.—It is found that when metallic oxides are heated in a slow current of dry phosgene, carbon dioxide and the chloride of the metal are formed, according to the general equation $MO + COCl_2 = CO_2 + MCl_2$. This method was first applied to the preparation of thorium chloride. E. Chauvenet observes that it has since been found to be generally applicable. In the case of those metals which form two chlorides, that highly chlorinated is formed. For instance, with iron, chromium, and aluminium, the chlorides Fe_2Cl_6, Cr_2Cl_6, and Al_2Cl_6 result. The only metals giving oxychlorides are tungsten, which forms WoO_2Cl_2, and titanium, which gives $TiCl_4 + TiO_2Cl_2$. The other chlorides obtained are $VaCl_4$, $TaCl_5$, $ZrCl_4$, $ThCl_4$, $SnCl_4$, $BaCl_2$, $MgCl_2$, $ZnCl_2$, $GlCl_2$, $MnCl_2$, $NiCl_2$, UCl_4, $CeCl_4$, YCl_3, $LaCl_3$. The temperature of action ranges from 350° with vanadic anhydride to 650° with thoria. Silica is not attacked. Since carbon oxychloride is now obtainable commercially in cylinders this method of producing pure anhydrous chlorides is convenient and simple.—Pharm. Journ. and Pharmacist, Febr. 25, 1911, 249; from Compt. rend., *152* (1911), 88.

Chlorides—Estimation in Bromides.—Otto Herting recommends the following new method for the detection and estimation of chlorides in bromides, which is based upon the observation that when bromides are heated with lead peroxide in acetic acid solution the bromine is liberated whereas the chloride remains unchanged: 3 Gm. of the bromide, 6 Gm. lead peroxide, and 50 Gm. acetic acid (50 per cent.) are heated together in a 200-Cc. flask on an asbestos plate, rotating the flask occasionally, until bromine vapor ceases to be eliminated and the mixture begins to assume a syrupy consistence; whereupon the flask is removed from the fire. The cooled mixture is diluted with water, filtered, and the filter well washed; then 20 Cc. of concentrated nitric acid are added to the filtrate, followed by 15 Cc. $\frac{N}{10}$ silver nitrate solution, and, after the further addition of 5 Cc. of ferric nitrate, it is titrated with $\frac{N}{10}$ potassium sulphocyanide solution.—Pharm. Ztg., lvi (1911, No. 25, 253.

Chlorides—Determination in Bromides.—H. Rabe describes a new method which enables the quantitative determination of chlorides contaminating bromine salts, by calculation from the number of cubic centimeters of $\frac{N}{10}$ silver nitrate solution consumed, and ascertained by direct titration.—Pharm. Ztg., lvi (1911), No. 50, 506.

Chlorides, Chlorates, and Perchlorates—Method of Estimation in Admixture.—M. Margueyrol has devised a method for the estimation of chlorides, chlorates, and perchlorates, the principle of which consists in the following facts: (1) In the heat, nitric acid in excess completely displaces the hydrochloric acid of chlorides; (2) in the heat, nitric acid completely decomposes chlorates into nitrates; (3) in the conditions in which the chlorides and the chlorates are destroyed, the perchlorates remain unchanged. The presence of chlorides is shown by the ordinary method of acidulating the aqueous solution of the salts with nitric acid, and adding silver nitrate. The chlorates are found by dropping a pinch of the dry material onto a few drops of concentrated sulphuric acid; chlorates, even in traces, produce a yellow color and disengage a characteristic odor. Finally the dry material got by evaporation of a solution of it, if necessary, is treated with excess of nitric acid of 36° to 40° Bé, evaporated gently to dryness on a sand-bath; it must be ascertained that the residue gives no reaction with silver nitrate, but if there should be, treatment with nitric acid is repeated, the residue fused with about ten times its weight of a mixture of equal parts of pure sodium carbonate and pure potassium nitrate, when the cold mass is taken up with dilute nitric acid, and treated with silver nitrate. A precipitate of silver chloride indicates perchlorates. When the proportion of chloride is rather high, nearly the whole of it should be eliminated by silver nitrate before treatment for chlorates. Estimation of the three salts: (1) In one portion of the sample, estimate the chlorine of the chlorides by the usual methods; (2) in another portion, brought to the solid state by evaporation, if necessary, estimate the total chlorine, by mixing the material with about ten times its weight of the fusing mixture referred to, and fusing in a platinum crucible, taking up the mass with dilute nitric acid, and estimating the chlorine, either gravimetrically or volumetrically: (3) in a third portion, the chlorides and chlorates are destroyed, and the chlorine in the residue estimated as in (2); this chlorine corresponds to the perchlorates. There is thus directly obtained the chlorides and the perchlorates; the chlorates are determined by difference.—Pharm. Journ. and Pharmacist, June 10, 1911, 773; from. Ann. Chim. Analyt., May 15, 1911, 167.

Sodium Chloride—Dietetic Importance.—Prof. Bunge points out that herbivorous animals, whether wild or domestic, in all climes require an allowance of sodium chloride. This is not so in carnivora. Herbivorous animals take three or four times as much potash with their food as the carnivora, and the conclusion suggested is that the richness in potash of a vegetable diet is the cause of the need for sodium chloride which the herbivora show. An explanation of this may be found in the interaction of the sodium chloride and the carbonate of potassium. The sodium salt is the principal inorganic constituent of blood plasma, and when salts of potash are largely taken into circulation in the food a double decomposi-

tion takes place, and the chloride of potassium is formed together with the carbonate of sodium. Hence the blood will contain an excess of carbonate of sodium, which will be eliminated by the kidneys, and to make good the loss a supplementary supply of sodium chloride is required. A man who lived entirely on potato would be taking as much as 40 Gms. of potash a day, and it would be almost impossible to do this without salt. People in the country who live chiefly on vegetables eat much more salt than those who live in towns and take more meat.—Pharm. Journ. and Pharmacist, Dec. 10, 1910, 699; from Journ. Pract. Diet. and Bact.-Therap., Oct., 1910.

Nitro-Hydrochloric Acid—Composition Suitable as a Gold Solvent.—E. Priwoznik contributes some practical notes on the composition of this acid for the purpose of dissolving gold, and he considers that the solution recommended by Prat is the best for all practical purposes. The composition of the solution is as follows: Concentrated hydrochloric acid, 200 Cc.; concentrated nitric acid, 45 Cc.; water, 245 Cc. One kilogramme of gold requires 4296 Gms. or 3849 Cc. of this solution to dissolve it. The equation is as follows: $Au + HNO_3 + 4HCl = 2H_2O + NO + HAuCl_4$. Sixty-three parts of HNO_3 correspond to 96.82 parts by weight of nitric acid of sp. gr. 1.4; 146 parts of HCl correspond to 369.12 parts by weight of hydrochloric acid of sp. gr. 1.1946. If either acid is in excess, the excess acid is not only useless but prejudicial.--Pharm. Ztg. lv (1910), No. 100, 1010; from Œsterr. Ztschr. Berg. u. Hüttenw., 1910.

Bromine—Content in the Human Organism.—A. Labat has determined the bromine content in the various organs of the human body, by drying and pulverizing the substance, incinerating the powder with five times its weight of calcined magnesia, free from bromine, and extracting the ash with water. The iodine was then eliminated by distillation with ferric alum, the residue was filtered, oxidized with sulphuric acid and potassium dichromate, and the bromine estimated colorimetrically with fluorescein. The results of the author's investigation show that the presence of bromine is variable, depending on physiological conditions, but that it is invariably present in the thyroid glands.—Pharm. Ztg., lvi (1911), No. 65, 653; from Bull. Soc. Chim., 1911, 393.

Iodides—Determination of Small Quantities.—R. Bernier and G. Peron recommend the following method for the determination of small quantities of iodides, which is based on two familiar reactions: The first is that which occurs when an iodide is heated, in an alkaline medium, with potassium permanganate. The iodide is then converted into iodate; while any bromide or chloride present is unaffected. The second is the familiar reaction between iodide and iodate in presence of an acid: $5KI + KIO_3 + 6CH_3COOH = 6I + 6CH_3.COOH + 3H_2O$. In the above the amount of iodine sought, resulting from the decomposition of the iodate, is one-sixth

the total amount present. An amount of the solution to be examined containing approximateiy 0.01 to 0.03 of iodine is a convenient quantity for analysis. This is diluted to 50 Cc., neutralized if acid, then made alkaline with 10 drops of caustic soda solution. A few crystals of potassium permanganate are then added, and the mixture is boiled for a short time until oxidation is complete. If the liquid does not retain its violet color, more permanganate must be added to ensure a slight excess. This is then removed by adding about 5 Cc. of alcohol to the hot liquid. After cooling, the volume is made up to 110 Cc., and exactly 100 Cc. is filtered off. To this 10 Cc. of acetic acid and 5 Cc. of potassium iodide solution 1 : 10 are added. The amount of iodine set free is then titrated in the usual manner with decinormal thiosulphate solution. The number of Cc. of the standard thiosulphate used, plus one-tenth, multiplied by 0.0127, and divided by 6, gives the amount of iodine sought, as expressed by the formula: $X = \frac{(N + \frac{n}{10} \times 0.0127}{6}$ where n = the number of Cc. of thiosulphate used. The method is exact and convenient, and by using centinormal solution of thiosulphate is applicable to the determination of very small quantities of iodine. In this case the use of starch indicator, added towards the end of the titration, is indispensable. The results obtained are comparable with those of gravimetric determinations.—Pharm. Journ. and Pharmacist, April 8, 1911, 461; from Journ. de Pharm. et Chim., 1910, *3*, 242.

Iodine—Estimation in the Tincture.—G. Favrel finds that Lebeau's process for the estimation of total iodine in the tincture is quite satisfactory, and has the advantage over others (equally good otherwise) that it is more rapid and convenient. The method consists in taking up the free iodine by powdered zinc, and titrating the zinc iodide formed by silver nitrate. The presence of free hydriodic acid is no obstacle, since this may be brought to the state of zinc iodide either by prolonged contact with the zinc powder, or by adding a little zinc carbonate after decolorization of the liquid.—Pharm. Journ. and Pharmacist, April 8, 1911, 461; from Ann. de Chim. Analyt., Jan. 15, 1911, 12.

Iodine—Estimation in Liquids of the Organism.—R. Bernier and G. Péron recommend the following method for the estimation of small quantities of iodine in liquids of the organism: Into a capsule of porcelain, or better, of nickel, 10 to 20 Cc. of urine are placed, and to this is added 0.5 Gm. of pure potassium hydroxide. The liquid is evaporated, dried at 100° C., and calcined, and the residue crushed. When cool, the contents of the capsule are taken up with a little distilled water, the liquid filtered, and the filter washed carefully with a 10 per cent. solution of sodium chloride or sulphate. A few crystals of potassium permanganate are added, the liquid maintained at boiling point for a few minutes to effect

oxidation; the solution should remain colored, if not, more permanganate must be added to ensure slight excess. The excess of permanganate in the hot liquid is got rid of by the addition of 5 Cc. of alcohol. The solution is cooled in a stream of water and made up to 110 Cc.; this is filtered and 100 Cc. collected. The filtrate is transferred to an Erlenmeyer flask, and treated with 1 Gm. of ammonium chloride and 10 Cc. of acetic acid, and boiled for five to ten minutes. It is now cooled, treated in 10 Cc. of acetic acid and 5 Cc. of a 10 per cent. solution of potassium iodide, and the iodine set at liberty is titrated with $\frac{N}{10}$ or $\frac{N}{100}$ thiosulphate, the latter if the quantity of iodine is less than a few milligrams, and in this case it is advisable to use freshly prepared starch water as indicator. To calculate, the number of Cc. of thiosulphate used, augmented by $\frac{1}{10}$, multiplied by 0.0127 (or 0.00127 according to the titre of the thiosulphate) and divided by 6, gives the weight of iodine contained in the sample. The preliminary calcination may, of course, be omitted if the liquid contains no organic iodine. An alcohol lamp should be used for the calcination, as loss is apt to occur with the Bunsen flame.—Pharm. Journ. and Pharmacist, Sept. 2, 1911, 325; from Jour. de Pharm. et Chim., Aug. 16, 1911, 151.

FLUORINE.

Hydrofluoric Acid—Action Upon Certain Oxides.—W. K. van Haagen and E. F. Smith have made an experimental study of the action of hydrofluoric acid upon certain metallic oxides. The hydrofluoric acid used was generated from well-dried calcium fluoride and concentrated sulphuric acid contained in a platinum retort which was connected with a platinum combustion tube, in which there was also a platinum boat carrying the material to be acted upon. The constricted portion of the combustion tube was cooled by means of a moist wad of filter paper, while its extreme end was allowed to dip into distilled water. The retort and its contents were gradually heated in a glycerol bath, by which means a constant and even flow of hydrofluoric acid gas was obtained. Aluminium oxide was thus converted into fluoride quantitatively in twenty minutes, and so also was lanthanum oxide, the salts formed not volatilizing. Zirconium oxide was fully converted at a red heat into fluoride, and so also was powdered zircon mineral; cerium dioxide changed into fluoride quantitatively, thorium dioxide was slightly altered; tin stone slightly, into fluoride or oxyfluoride. Potassium dichromate lost nearly all its chromic acid; sodium tungstate was attacked with difficulty, sodium pyrophosphate with evolution of a great amount of heat, the phosphoric acid being completely driven into the receiver. The change in this latter case indeed is so complete, was effected with so much ease, and was of such a truly quantitative character that it is thought that the atomic weight of phosphorus may readily be determined in this way, and the authors are investigating in this direction. It will give the ratio of P : NaF. As sodium fluoride is readily

converted into sodium chloride, the ratio of P : NaCl is the one that is being determined. Incidentally, this will also give the ratio F : Cl.—Pharm. Journ. and Pharmacist, October 14, 1911, 499; from Journ. Amer. Chem. Soc., September 11, 1911, 1504.

SULPHUR.

Sulphur—Expedients to Facilitate Wetting.—Vermorel and Dantany find that the addition of 1 per cent. of soap to sulphur suffices to make it easily wetted by water, but not by solutions of metallic salts. This disadvantage may be got over by dissolving 200 Cc. of commercial oleic acid in 2 liters of denatured alcohol and mixing this with 100 kilos of sulphur and evaporating the alcohol. Sulphur prepared in this way is wetted by water and by solutions of acid, neutral, or basic salts very readily.—Pharm. Journ. and Pharmacist, Nov. 4, 1911, 593; from Compt. rend., *153*, 194.

Sulphur—Analysis of Different Forms Used in Agriculture.—A. Bruno describes the following three commercial forms of sulphur and suggests methods for their analytical examination: (1) Sublimed sulphur (flowers of sulphur); (2) powdered sulphur; and (3) precipitated sulphur. The commercially pure product (1) contains at least 98.5 per cent. of sulphur, 0.5 per cent. of ash at the most, and 0.5 per cent. of moisture. It is composed of amorphous particles as well as of crystals, the proportion of the latter being about 10 or 12 per cent. The proportion of matter insoluble in carbon disulphide ranges from 12 to 33 per cent. The commercial product (2) contains at least 97 per cent. of crystallized sulphur, 2 per cent. of ash at the most, and 0.5 per cent. of moisture. Product (3) contains no crystals. Its content of sulphur should correspond with that guaranteed by the vendor, with a tolerance of 2 per cent. The degree of fineness should be checked by a sieve of recognized caliber. The moisture and ash are determined in 5 Gm. of the sample, heating for two hours in an oven at 90–95° C., and weighing. The loss of weight represents the moisture; and dried material on incineration gives the mineral matter. If the product appears to be notably impure, the free sulphur is estimated thus: 1 Gm. of the powdered material is treated in a half-liter flask with 10 Cc. of solution of caustic soda of 36° Bé., free from sulphates, and 20 Cc. of water, and boiled for five minutes; then the particles adhering to the sides of the flask are washed down with a jet of water and the boiling continued for a quarter of an hour; the mixture is cooled, decanted into a flask marked at 100 Cc. and washed, when the liquid is shaken and filtered. The filtrate contains all the sulphur in the state of polysulphide and hyposulphite; 25 Cc. are then oxidized by four successive additions of 5 Cc. each of sodium hypobromite recently made from bromine, 2 Cc.; caustic soda solution, 10 Cc.; water, 20 Cc. The mixture is now made strongly acid by adding dilute hydrochloric acid (1 : 3) gradually, with vigorous shaking, boiled again to expel excess of

free bromine, cooled, and made up to 100 Cc. Of this, 40 Cc. is precipitated with 10 Cc. of 10 per cent. barium chloride solution, while boiling. The precipitate of barium sulphate, calcined, corresponds to 0.1 Gm. of the substance taken. Sulphates originally present are determined by a preliminary experiment. For the estimation of matter insoluble in carbon disulphide, in the case of flowers of sulphur, 1 Gm. is shaken with 30 Cc. of carbon disulphide in a stoppered flask, then repeating the shaking at intervals of half, one, and one-and-a-half hours, and leaving it at rest until the end of the second hour, when 10 Cc. of the liquid, drawn off by pipette, is evaporated in a tared capsule, and the residue weighed. The microscopical characters of these sulphurs are dealt with by M. E. Collin, who maintains that analytical results should be controlled by microscopical examination.—Pharm. Journ. and Pharmacist, Aug. 13, 1910, 235; from Ann. de Chim. Analyt., 1910, 235.

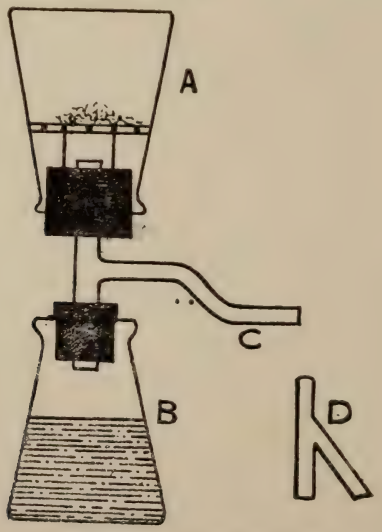
Sulphur—New Method of Estimation in Organic Compounds.—T. St. Warunis recommends a new method for the estimation of sulphur in organic compounds, which consists in the use of sodium peroxide and potassium hydroxide free from sulphate. Into a sufficiently large silver, nickel, or porcelain crucible, 0.2 to 0.4 Gm. of the finely-powdered substance is placed, with a mixture of 10 Gms. of finely-powdered sulphate-free potassium hydroxide and 5 Gms. of sodium peroxide; the whole is intimately mixed by means of a silver wire, and dried in a drying oven at 75° to 86° C. The crucible is covered, and the temperature should not be allowed to rise. When the mixture sinters and begins to melt, as it will do in about a quarter of an hour, the crucible is heated by means of a small flame, to be gradually increased, until the mixture becomes quite a thin liquid. In this state it is left for a short time. The melt thus obtained, when cold, is taken up with water, which readily dissolves it, the solution acidified with hydrochloric acid, containing bromine, oxidized, filtered, and boiled until the odor of bromine has disappeared. In the resulting solution the sulphuric acid formed is separated, by means of barium chloride, as sulphate, and estimated, in the usual way. The process can be carried out in two hours, and excellent results are claimed to be obtained.—Pharm. Journ. and Pharmacist, Jan. 7, 1911, 37; from Chem. Ztg., Dec. 6, 1910, 1285.

Sulphur—Accurate Determination in Pyrites and Marcasite.—E. T. Allen and John Johnston state that when sulphides of iron are ground up for analysis partial oxidation takes place, with formation of sulphur dioxide and ferrous sulphate, and if the material is finely powdered the error cannot be neglected; it may be reduced to 0.05 per cent. by careful grinding till the material will pass through an 8 (per Cm.) mesh sieve. When material which is not uniform has to be powdered, the error can be determined by washing out a weighed amount of the powder with boiling water

in an atmosphere of carbon dioxide and determining the iron in the washings. The authors find that there is no loss of sulphur in Carius's method (oxidation in closed tubes), but Lunge's and Fresenius's methods both give low results owing to loss of sulphur by oxidation. In an improved method the iron is removed by two precipitations with sodium carbonate. In the precipitation of barium sulphate the free acid must be limited to a small definite amount, and precipitation must be effected at a definite rate. Three corrections must be applied to the weight of the barium sulphate precipitate—(1) A correction for solubility, depending on the volume of the solution and the amount of free acid ; (2) a correction for the occlusion of sodium sulphate in the precipitate, which depends on various circumstances, but chiefly upon the amount of alkali chloride originally present in the solution ; (3) a correction for the free sulphuric acid set free on heating.—Chem. News, Feb. 24, 1911, 95 ; from Ztschr., f. Anorg. Chem., *69* (1911), No. 2.

Sulphuretted Hydrogen—Simple Generator.—E. Rattenbury Hodges describes the simple sulphuretted hydrogen generator shown by Fig. 67 : Into two conical flasks, preferably of thick glass, perforated rubber stoppers are tightly fitted ; the upper flask, *A*, is provided with a thin

FIG. 67.



Sulphuretted Hydrogen.

wooden or stout cork perforated disc, previously soaked in hot paraffin. On this disc the iron sulphide rests, while the other flask, *B*, is charged with the acid. The two vessels are connected by a T-piece, which may have the shape indicated by *C* or *D*, the latter probably being a better form of delivery tube. The method of use is obvious, it being only neces-

sary to cautiously turn the apparatus in order to get a flow of gas. If the apparatus is so turned as to keep the curved delivery tube upright, no acid will enter it. Obviously, also, the apparatus may serve for the production of hydrogen, carbon dioxide, and other gases.—Chem. News, October 20, 1911, 189.

Sulphur—Determination by Carius's Method.—G. Anelli observes that when sulphur in an organic compound is determined by heating the body with fuming nitric acid alone in a sealed tube at 180° to 200° C., the result obtained is always too high, and this is due to silicic acid from the glass going into solution. It is therefore recommended that barium nitrate should always be introduced with the nitric acid, so that the sulphuric acid formed is at once converted into barium sulphate.—Apoth. Ztg., xxv (1911), No. 45, 455; from Gazz. Chim. Ital., 1911, 334.

Earthy Sulphides—Valuation.—Frederick T. Gordon recommends the following method for the convenient valuation of earthy sulphides, which he has used with satisfaction in testing some samples of "Sulphurated Lime." The method was originally suggested by H. M. Sechler: Into a tared flask of about 100 Cc. capacity, provided with a tight stopper, weigh approximately 100 Mgm. of the material to be assayed. Add 25 Cc. distilled water, then add, from a burette, exactly 20 Cc. of $\frac{N}{10}$ iodine solution, agitating the contents of the flask sufficiently to insure thorough admixture. Now add 5 Cc. hydrochloric acid U. S. P. and at once tightly cork the flask to prevent escape of H_2S (especially when assaying sulphurated lime). Shake the mixture gently but sufficiently to cause thorough admixture of reagents. The reaction will be complete, for all practical purposes, in a few minutes; the amount of H_2S that will be liberated and escape unaffected above the level of the liquid in the flask, if it is tightly corked, on addition of the acid, has been found to be negligible. Now titrate the uncombined iodine with $\frac{N}{10}$ sodium thiosulphate, using starch solution to determine the end reaction. Each Cc. of $\frac{N}{10}$ iodine solution consumed in the reaction shows the following amount of absolute sulphide present: Calcium sulphide, .00358 Gm.; barium sulphide, .0831 Gm.; strontium sulphide, .0594 Gm. The method described was found applicable for the assay of "depilatory mixtures," which usually consist of either barium or strontium sulphide and starchy matter in various proportions. About 200 Mgm. of the compound to be assayed is a convenient amount, weighed into a tared flask, and the operation conducted the same as for the undiluted sulphides, except that the presence of starch should be first confirmed and then due precautions be taken that the starch should not interfere with the end reaction in titrating with the sodium thiosulphate.—Pharm. Era, January, 1911, 21.

Liver of Sulphur—Value as a Fungicide.—F. W. Forman states that liver of sulphur is now used in large quantities to combat the ravages of

the gooseberry-mildew and other fungous pests. The experiments made by the author warrant him in concluding that the fungicidal action of liver of sulphur is mainly due to the free caustic alkali present, or to that produced by the decomposition of the polysulphides which are among the constituents of the mixture. He doubts whether the sulphur present has any marked fungicidal action, and finds that liver of sulphur made with soda is more effective, as well as cheaper, than that made with potash, a point of considerable practical utility to the gardener. He further suggests that the solutions of caustic soda, much weaker than those of liver of sulphur usually employed, might be quite as effective as the latter, and far less costly.—Pharm. Journ. and Pharmacist, March 25, 1911, 399; from Gard. Chron., Jan. 21, 1911.

Persulphates of Divalent Metals—Preparation.—G. A. Barbieri and F. Calzolari find that on evaporating solutions of the persulphates of divalent metals in a vacuum over sulphuric acid, mixtures of sulphate and persulphate are obtained under favorable conditions. On the other hand, the ammonia compounds of the persulphates of zinc, cadmium, nickel, and copper are easily obtained. A concentrated solution of ammonium persulphate is added to a strongly alkaline solution of the sulphate of the metal. The compounds obtained are: Zinc, $ZnS_2O_8.4NH_3$, transparent prisms, separating from very concentrated solutions; cadmium CdS_2O_8, $6NH_3$, white powdery precipitate of microscopic crystals; nickel, NiS_2O_8, $6NH_3$, bright blue-violet crystals; copper, $CuS_2O_8,4NH_3$, acicular, dark blue-violet crystals. Compounds of metallic persulphates, with pyridine and with hexamethylene-tetramine can be prepared in a similar way.—Pharm. Journ. and Pharmacist, Nov. 4, 1911, 593; from Zschr. f. Anorg. Chem., *71* (1911), 347.

SELENIUM.

Selenous Acid—New Reactions and Their Practical Application.—F. Klein describes some new reactions of selenous acid (H_2SeO_3) and their practical application. Thus acetic acid anhydride may be distinguished from glacial acetic acid by boiling it with a crystal of selenous acid or of sodium selenite, whereby red selenium is formed, whereas with glacial acetic acid the solution remains clear. Strong ethyl alcohol may be distinguished from methyl alcohol by adding two drops of selenic (selenous ? Rep.) acid and a trace of silver bromide. An amorphous precipitate, soluble in water, is produced in ethyl alcohol but not in methyl alcohol. A number of alkaloids, such as strychnine, brucine, aconitine, atropine, morphine, codeine, quinine, caffeine, etc., and digitalin and cantharidin, are characterized by giving certain color reactions with concentrated sulphuric acid, to which a trace of sodium selenite has been added—these color reactions being distinct from those obtained with H_2SO_4 alone.—Pharm. Ztg., lv (1910), No. 100, 1010; from Journ. Ind. Eng. Chem., 1910, through Chem. Ztg., 1910, No. 136.

TELLURIUM.

Tellurium—Atomic Weight.—Marckwald had found from the conversion of telluric acid $H_2TeO_4 + 2H_2O$ into the dioxide TeO_2 that the atomic weight of tellurium is 126.85, while the value given by the International Ato mweight Commission is 127.5 Brauner oxidised TeO_2 in alkaline solution by permanganate in excess, acidified with sulphuric acid, added oxalic acid in excess, and titrated with permanganate. The value he obtained was 127.05. W. Marckwald and A. Foizik have now repeated these experiments with some modifications, using iodine and thiosulphate for the back titration, and get a result agreeing very well with that given in the International Atomic Weight Table. Possibly the values given from the conversion of telluric acid into the dioxide were too low owing to the formation of a solid solution of the telluric acid hydrate with a higher hydrate.—Chem. News., Oct. 21, 1910, 210; from Ber. d. D. Chem. Ges., *43* (1910), No. 9.

Tellurium—Researches on its Complexity.—W. R. Flint records the results of some researches on the complexity of tellurium. A large quantity of tellurium of atomic weight 127.5 was prepared. After ten hydrolytic fractionations with hot water of a solution of this preparation in hydrochloric acid, a product was obtained which consisted of the dioxide. The atomic weight of the tellurium of the tenth fraction was 124.3. Atomic weight determinations with the intermediate fractions gave 126.6 and 125.4, and thus a progressive lowering of the atomic weight occurs. Thus 124.3 appears to be the nearest approximation yet reached to the atomic weight of elementary tellurium. Fractionation by the hydrolysis of the nitrate was next attempted, but it is impossible to say from the results at present obtained whether this method is more rapid than the hydrolysis of the chlorine. The reactions of the less easily hydrolysed part agree with those of tellurium except in one particular.—Chem. News, Dec. 16, 1910, 305; Ztschr. f. Anorg. Chem., *68* (1910), No. 3.

Tellurium—Alleged Complexity.—The anomalous position of tellurium in the periodic table has made this element the subject of more researches than any other during the last twenty years. The high values obtained for the atomic weight have led to the supposition that tellurium contains a second element of high atomic weight, but extensive attempts to separate it into two different elements have been unsuccessful. Some time ago, however, Browning and Flint claimed that they had separated tellurium by fractional decomposition of the tetrachloride with water. The tellurium dioxide obtained in this way was converted into the basic nitrate and the atomic weight determined, after ten such fractionations, was given by Flint as 124.3. A. G. Vernon Harcourt and H. B. Baker have now repeated this work, but have been unable to effect any separation. They

suggest that the low figure obtained by Flint is due to the presence of some tellurium trioxide in the dioxide.—Pharm. Journ. and Pharmacist, June 24, 1911, 844.

Tellurium and Telluric Acid—Methods of Determination.—Arthur Rosenheim and M. Weinheber give a gravimetric method to determine tellurium and an alkalimetric method for telluric acid. To determine tellurium, the aqueous solution of a tellurium compound is treated with a faintly ammoniacal solution of hydrazine sulphate and heated to 130° C. in a low-pressure autoclave. The tellurium then separates in a glittering grey deposit, and may be filtered off and dried in an atmosphere of CO_2. Telluric acid forms with glycerin a glycerin telluric acid. If a large excess of barium hydroxide solution, or barium chloride and caustic soda, is added to a telluric acid solution, $BaTeO_4$ is precipitated, and can be filtered off and the excess of alkali titrated with oxalic acid. The authors have in this connection prepared a number of alkali double salts—

Telluric Acid Oxalates.—If telluric acid is added to an aqueous solution of an alkali oxalate, telluric acid oxalates crystallize out; thus the potassium, rubidium, and cæsium salts have been prepared. The authors have determined the solubility of the salts in water at different temperatures. If the solubility of the potassium salt is compared with that of potassium tellurate and of oxalic acid it is found that the solubility shows a very decided decrease, which is a proof of the formation of a complex.—Chem. News, March 17, 1911, 132; from Ztschr. f. Anorg. Chem. *69* (1911), No. 3.

Tellurium—Preparation of Tetravalent Organic Compounds.—Charles Lederer describes the methods of preparing a number of organic compounds of tellurium. Phenyl telluride $(C_6H_5)_2Te$ can be prepared by adding tellurium tetrachloride to an ethereal solution of phenyl magnesium bromide. When its aqueous solution is heated with potassium iodide triphenyltelluronium iodide, $(C_6H_5)_3TeI$, is obtained, and can be converted into the corresponding chloride or bromide by double decomposition with a boiling suspension of silver chloride or silver bromide. Besides this type of tetravalent compounds of tellurium there is another series containing two atoms of halogen, e. g., $(C_6H_5)_2TeBr_2$, while a third series may be prepared by the addition of hydracids to phenyl telluride; thus with hydrochloric acid the compound $(C_6H_5)_2TeHCl$ is obtained.—Chem. News, Nov. 25, 1910, 270; from Compt. rend., *151* (1910), No. 14.

Tellurium Carbide, CTe_2—Formation and Properties.—A. Stock and Herbert Blumenthal volatilized tellurium in the arc under thoroughly cooled carbon disulphide, the anode being Acheson graphite. When all the tellurium had volatilized, the yellow solution was filtered and concentrated, and then distilled in a current of carbon disulphide. The distillate contained a very small quantity of a volatile compound of carbon and tellu-

rium, which analysis proved to be the ditelluride, CTe_2, corresponding to carbon disulphide. Tellurium carbide is exceeding unstable and possesses an unbearable smell. It is very soluble in carbon disulphide and in other organic solvents.—Chem. News, Sept. 29, 1911, 161; from Ber. d. D. Chem. Ges., *43* (1911), No. 11.

NITROGEN.

Nitrogen—Improvement in Industrial Manufacture.—Georges Claud observes that in Linde's process for freeing nitrogen of the air from oxygen, the air is liquefied and then evaporated, the vapor, ascending a rectifying tower, is washed by a descending stream of liquid air containing 21 per cent. of oxygen, and the oxygen in the vapor is thus retained by the liquid. In this way nitrogen containing only 7 per cent. of oxygen can be obtained. If this impure nitrogen is compressed to about 4 to 5 atmospheres, dried, and then again liquefied and treated as before, a liquid much less rich in oxygen is obtained, and if a reflux condensing apparatus is used, 99.6 per cent. pure nitrogen can be prepared by progressive condensation and rectification.—Chem. News, Dec. 8, 1911, 282; from Compt. rend., *153* (1911), No. 17.

Pure Argon and Nitrogen—Preparation and Properties.—Franz Fischer and Otto Hähnel, have devised a new apparatus by which perfectly pure argon can be prepared; the same apparatus can also be used in the preparation of other gases in the pure state. The density of perfectly pure argon is 19.945. This value practically agrees with that stated by Ramsey. The density of nitrogen when prepared pure in the same apparatus is 14.018. As purification proceeded a brilliant luminescence was noticed when argon was passed through the apparatus. Similar phenomena have been obtained in the case of neon and helium, while with nitrogen they do not appear.—Chem. News, July 22, 1910, 48; from Ber. d. D. Chem. Ges., *43* (1910), No. 8.

Nitrogen—Detection in Organic Substances.—Castellano's test for nitrogen in organic substances consists in heating a mixture of pure dry sodium carbonate or potassium carbonate and magnesium in a test tube, and when the interaction between these bodies commences, adding the organic substance. The magnesium sets free potassium or sodium, which, being nascent, combines readily with carbon and nitrogen to form cyanide, and, with sulphur and halogens, to form sulphide and halogen salts. It was recommended as an excellent means of testing for nitrogen in organic substances, and also for testing the same for halogens and sulphur. On testing pure samples of chloroform and carbon tetrachloride for nitrogen by this method H. R. Ellis found that a copious precipitate of Prussian blue was obtained, and so also with other pure substances known to contain no nitrogen. This was found to be formed during the action of the magnesium powder on the carbonate from atmospheric nitrogen. If this

reaction is allowed to take place slowly, without largely exposing to the air, cyanide is formed; if violently, with plenty of air none is formed. The same reaction takes place when mixtures of magnesium and either calcium carbonate, barium carbonate, or strontium carbonate interact in contact with a small amount of air. In these cases, cyanide, cyanamide, nitride, and carbide are formed. The author, therefore, concludes that as a test for nitrogen the reaction is useless.—Chem. New, Oct. 14, 1910, 187.

Nitric Nitrogen—Estimation in the State of Ammoniacal Nitrogen.—C. Frabot suggests the following method for estimating nitric nitrogen in commercial nitrates: 8.5 Gm. of sodium nitrate, or 10.1 of potassium nitrite, is dissolved in distilled water, in a flask marked at 1 liter, and the solution made up to the liter mark at 15° C. Of this, 100 Cc. is placed in a round-bottom liter flask, with at least 6 or 7 Gm. of aluminium cuttings, and 50 Cc. of solution of soda of 36° (Bé.). The flask is at once attached to a distilling apparatus, at the extremity of which is affixed a drawn-out tube dipping into 10 Cc. of $\frac{N}{1}$ sulphuric acid. The flask is heated gently; an abundant disengagement of hydrogen takes place; when the aluminium is dissolved, the liquid is boiled rapidly and distilled until 40 or 50 Cc. have collected. This is titrated back with $\frac{N}{10}$ alkali, using methyl orange or cochineal as indicator. If the nitrate is chemically pure, the 10 Cc. of $\frac{N}{1}$ sulphuric acid will have been exactly neutralized. The number of Cc. saturated multiplied by 10 gives the percentage of pure nitrate contained in the sample. The analytical figures given correspond very closely with the theoretical. In the case of a mixture of a nitrate with an ammoniacal salt, distillation is first made without the aluminium, in order to estimate the ammoniacal salt. This done, the aluminium is added and distillation again effected; this gives the nitric nitrogen. In the case of a nitrate mixed with an ammoniacal salt and an organic nitrogen compound, the total nitrogen is estimated by the Kjeldahl-Jodlbaüer method, then the ammoniacal nitrogen and nitric nitrogen by the method described above. Great accuracy is claimed for this reduction method.—Pharm. Journ. and Pharmacist, July 16, 1910, 71; from Anal. de Chim. Analyt., 1910, 219.

Nitrogen—Liability of Error in Kjeldahl-Determinations.—E. F. Harrison and P. A. W. Self call attention to a possible source of error when carrying out determinations of nitrogen by one or the other of the modifications of Kjeldahl's method now almost universally employed. When adequate care is taken in carrying out each step of the process, this method leaves nothing to be desired. But there is one possible source of considerable error which applies to all the modifications, which in the experience of the authors is not always avoided. In distilling off the ammonia after the digestion with sulphuric acid is complete, if the liquid

is allowed to become too concentrated, small quantities of spray are mechanically carried over with the stream, in spite of precautions to prevent this which might be supposed to be adequate, and as the liquid which thus passes over is strongly alkaline, these small amounts of spray become reckoned as ammonia and so increase the percentage of nitrogen found. If a blank determination is made with the materials, keeping to exactly the same conditions as regards strength of liquid, time of distillation, etc., the error is of course eliminated. The authors give the details of the method adopted by them, whereby error from the source described is prevented.—Pharm. Journ. and Pharmacist, July 2, 1910, 4.

Pure Nitrous Oxide — New and Safe Method of Preparation.—A. Quarkaroli recommends a new and safer method of preparing pure nitrous oxide than that of heating ammonium nitrate, which is not altogether exempt from danger. It consists in heating 0.5 Gm. of potassium nitrate with 20 to 25 Cc. of formic acid, and collecting the gas evolved over a 20 per cent. solution of potassium hydroxide, which serves to absorb the carbon dioxide simultaneously formed. The heat is applied carefully, and the flame removed as soon as the action has begun. When the action ceases, another 0.5 Gm. of potassium nitrate is added, and so on until all the formic acid is used up. The action takes place quantitatively according to the equation $2KNO_3 + 6HCO_2H = N_2O + 4CO_2 + 5H_2O + 2HCOOK$. The decomposition may be applied to the

Estimation of Nitrates, the action being carried out in a test-tube, and the gases collected over mercury in a graduated cylinder of 250 Cc. capacity; the volume of mixed gases is first measured, and then the volume obtained after absorbing the CO_2 by introducing 2 Cc. of concentrated solution of potash. The measurements serve to control one another. An analysis by this method may be effected in about five minutes. The action is said to involve initially the formation of nitrous anhydride, which then acts catalytically, and greatly accelerates the velocity of the change. Traces of hydrogen peroxide, chloric acid, or potassium permanganate, greatly retard the decomposition; urea also does so, but not so distinctly.—Pharm. Journ. and Pharmacist, Nov. 25, 1911, 711; from Gaz. Chim. Ital., Sept. 19, 1911, through "Nature," Oct. 26, 1911, 562.

Nitrites—New Method of Determination.—E. Rupp and F. Lehmann propose a new method for the determination of nitrites, which is based on the fact that nitrous acid is oxidized quantitatively to nitric acid by bromine according to the equation: $HNO_2 + 2Br + H_2O = HNO_3 + 2HBr$. The reagents required are a solution of potassium bromate containing 0.6702 Gms. per liter, and potassium bromide solution containing 6 Gms. per liter. When equal volumes of these solutions are added to the nitrite solution and the whole acidified, the calculated amount of bromine is liber-

ated, and the excess over that required to oxidize the nitrite may be determined by adding potassium iodide and titrating liberated iodine with standard sodium thiosulphate solution. The result is calculated from the equivalents. Fifty Cc. of the above bromate solution are equivalent to 30 Cc. of $\frac{N}{10}$ thiosulphate solution. For the determination of the purity of sodium nitrite, for example, 2.5 Gm. of the sample are dissolved in 500 Cc. of water, and 10 Cc. of this solution are placed in a 250-Cc. stoppered bottle. Fifty Cc. each of the bromate and bromide solutions are run in, 10 Cc. of dilute sulphuric acid are added, and the bottle quickly closed, well shaken, and set aside in the dark. After standing for half an hour, 0.5 Gm. of potassium iodide is added, the mixture is well shaken, allowed to stand for two minutes, and then titrated with $\frac{N}{10}$ sodium thiosulphate solution, using starch as indicator. The number of Cc. of thiosulphate solution required is deducted from 30, and the difference multiplied by .00345 gives the amount of sodium nitrite in 0.05 Gm. of the sample.—Archiv. d. Pharm., *249* (1911), No. 3, 214.

Nitrites—Estimation in Waters.—G. Blanc has investigated the respective merits of Trommsdorff's and Griess's methods of estimating nitrites in waters, and comes to the conclusion that the latter is preferable. In principle it consists in adding to a solution containing nitrous acid, a solution of metaphenylenediamine, when there is formed a brown coloring material, Bismarck brown or Vesuvine. Its intensity, compared with that produced in a solution containing a known quantity of nitrate, renders it serviceable as a means of estimating the quantity of nitrate contained in the water examined.—Pharm. Journ. and Pharmacist, Oct. 14, 1911, 499; from Journ. de Pharm. et Chim., Sept. 1, 1911, 205.

Nitrites—New Reagents for their Detection in Potable Waters.—Dané proposes as reagent for nitrous acid in potable waters a solution of 0.02 of synthetic indol in 150.0 of 95 per cent. alcohol. If 2 to 5 Cc. of this new reagent are added to water containing nitrites, and the water is then acidulated with a 50 per cent. sulphuric acid, a rose-red color is developed in the course of one minute. The reaction is quite sensitive; it may be made available for colorimetric determinations of nitrites in water; and serves also for the detection of nitrous acid in other reagents.—Pharm. Ztg., lvi (1911), No. 55, 556; from Bull. de la Soc. chim. de France, *9*, 354.

Nitrates—Detection in Potable Waters.—Caven and Ragnet recommend a solution of salicylic acid in concentrated sulphuric acid as a valuable reagent for nitrates in drinking waters. Ten Cc. of the water are evaporated to dryness, the residue is triturated with 1 Cc. of the reagent and 10 Cc. of water, followed by 10 Cc. ammonia are added. In the presence of nitrates a yellow color is developed which may be made available for their colorimetric estimation. It is essential that the reagent be

freshly prepared; but this can be avoided by adding 1 Cc. of a 1 per cent solution of sodium salicylate to the evaporating water under examination, and then adding simply concentrated sulphuric acid, followed as before mentioned with water and ammonia.—Pharm. Ztg., lvi (1911), No. 55, 556; from Rép. de Pharm., 1911, No. 6.

PHOSPHORUS.

Hypophosphoric Acid—Preparation and Molecular Weight.—Arthur Rosenheim and Jacob Pinsker find that Corne's method of preparing hypophosphoric acid—fusing yellow phosphorus in a solution of copper nitrate—gives satisfactory results, and a good yield can also be obtained by the anodic oxidation of phosphorus, metallic phosphide being used as anode, and the metal of the phosphide as cathode, in a bath made slightly acid with sulphuric or formic acid. Copper phosphide is specially suitable for this purpose. After the removal of the heavy metal from the electrolyte half of it is made neutral with sodium carbonate, and added to the other half. The whole is then evaporated down when $NaHPO_3 + 2H_2O$ crystallizes out. The difficultly soluble very characteristic guanidinium subphosphate is a convenient salt for detecting hypophosphoric acid. Cryoscopic determinations show that the molecule of hypophosphoric acid is H_2PO_3, which undergoes association in aqueous solution, giving complexes $(H_2PO_3)x$.—Chem. News, Nov. 11, 1910, 245; from Ber. d. D. Chem. Ges., *43* (1910), No. 11.

Phosphoric Acids—Mutual Conversion of Ortho-, Pyro-, and Meta-Acids into One Another on Heating.—D. Balareff finds that when the vapor tension of the water over heated orthophosphoric acid is increased, the temperature of formation of the pyro-acid rises more quickly than that of the meta-acid. On account of the volatility of the meta-acid the transformation could be investigated by the author only at a relatively low temperature, so that it was not possible to reach the point at which the temperature of formation-curves for the pyro- and meta-acids cut one another; consequently, the direct conversion of ortho- into meta-acid could not be effected.—Chem. News, Oct. 14, 1910, 197; from Ztschr. f. Anorg. Chem., *67* (1910), No. 2.

Phosphoric Acid and Ammonium Phosphate—Modification of the B. P. Methods of Assay.—The difficulties attendant on the use of the official (B. P.) process of assaying *phosphoric acid*, chiefly due to the ready fusibility of lead monoxide and the ease with which it attacks a porcelain crucible, are overcome by T. E. Wallis, by substituting magnesium oxide for the lead oxide. Furthermore, he finds that the purity of *ammonium phosphate* can be rapidly and correctly determined by ignition with magnesium oxide, and might replace the more tedious official process of precipitation by magnesia mixture. The author finds also that *di-ammonium*

phosphate of the purity demanded by the B. P. can be prepared. It does not redden blue litmus paper—a statement which should be included in the B. P. in order to exclude many commercial samples deficient in ammonia.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1910, 405–408.

Phosphoric Acid—Volumetric Methods of Elimination.—After a comparative review of the different methods for the quantitative estimation of phosphoric acid described in the literature, W. Strecker and P. Schiffer arrive at the conclusion that the volumetric method with uranium salts is quite as accurate as the gravimetric method usually relied upon. They furthermore find that the method depending on the precipitation of phosphoric acid with volumetric silver nitrate solution in acetic acid solution, and titration of the excess of silver nitrate with ferrous cyanide, gives values which are in no respects less accurate than those obtainable by gravimetric methods.—Pharm. Ztg., lvi (1911), No. 55, 556; from Ztchr. f. Analyt. Chem., 1911, No. 8.

Perphosphoric Acid — Production and Properties. — According to J. Schmidlin and T. Massini, mono-perphosphoric acid, H_3PO_5, is obtained by the interaction of small quantities of phosphoric anhydride and Merck's perhydrol. The reaction is represented by the equation: $P_2O_5+2H_2O_2+H_2O=2H_3PO_5$. It is an oxidizing agent of great power. Since it readily converts manganese compounds into permanganates it forms a useful reagent for that metal. Perphosphoric acid, $H_4P_2O_8$, is formed when syrupy commercial phosphoric acid, kept cool with melted ice, is treated with small quantities of perhydrol.—Pharm. Journ. and Pharmacist, August 20, 1910, 277; from Berichte, *43* (1910), 1162.

Phosphorus Pentoxide—Solution in Water.—D. Balareff has made experiments to clear up conflicting statements in the literature regarding the nature of the product obtained when phosphorus pentoxide dissolves in water. Pure crystallized P_2O_5 was placed under bell-jars (1) with 75 per cent. sulphuric acid, (2) with 9 per cent. sulphuric acid, (3) with water, and allowed to deliquesce completely. In the first experiment the action was complete at the end of six days, in the second after two hours, and in the third after seven minutes. In every case only metaphosphoric acid was produced. Pyro- and ortho-phosphoric acid were not present in recognizable quantity.—Pharm. Journ. and Pharmacist, Feb. 25, 1911, 249; from Ztschr. Anorg. Chem., 1910, No. 69, 215.

BORON.

Colloidal Boron—Preparation.—F. Ageno and E. Barzetti prepare colloidal boron by heating to dull redness three parts of boric anhydride with one part of powdered magnesium. The mass, cooled and pulverised, is washed with dilute hydrochloric acid, decanted, and heated to

boiling with concentrated hydrochloric acid. On decanting into water, the boron dissolves with production of a brownish-red liquid, which remains stable for two months. The solution presents the Tyndall phenomenon, and is negatively electrified. Hydrogen dioxide is decomposed by the solution with production of boric acid. Small traces of electrolytes precipitate the boron completely.—Pharm. Journ. and Pharmacist, June 17, 1911, 809; from Atti R. Accad. dei Lincei (5), xix, (1911), 381, through Nouv. Remèdes, Jan. 24, 1911, 34.

Boric Acid—Influence on Diastasic Action.—H. Agulhon states that diastases which hydrolyse carbohydrates, and also those which attack proteins, act even in cold saturated solution of boric acid. Its retarding action towards these enzymes is very slight. Among the ferments experimented with are sucrase, amylase of the prancreas, emulsin and trypsin. Boric acid is inactive towards oxydases and peroxydiastases. In some unexplained manner it seems to favor the action of coagulation; this result is observed in three diverse forms of coagulation—that of milk, pectin, and of melanins. On the whole, boric acid is remarkably inactive on ferments as a class.—Pharm. Journ. and Pharmacist, Jan. 7, 1911, 9; from Ann. Inst. Past., *24* (1910), 495, through Journ. de Pharm. et Chim., 1910, *2*, 363.

Borax—Behavior Towards Zinc Salts in Aqueous Solution.—Friedrich Borchers finds that when cold saturated borax solutions are precipitated with zinc salts (sulphate or chloride) the amount of boric acid entering into the precipitate increases with the concentration of the substances. The best yields of zinc borate are obtained if the solution of zinc salt is poured into the borax solution, and the borax is present in slight excess. Zinc sulphate or chloride must be used in as concentrated a form as possible, or in the solid state. From cold saturated solutions of borax the highest percentage of borax precipitated as zinc borate was 38.6 per cent. With supersaturated borax solution or with solid borax, zinc borate precipitates containing up to 83 per cent. of the boric acid in the solution can be obtained. For pure borax solutions an excess of the precipitating reagent causes a diminished yield of zinc borate. Thus zinc borate is soluble in zinc sulphate, complex salts being formed. Other salts act also as solvents; *e. g.*, sodium chloride and magnesium chloride. Manganese chloride and sulphate also precipitate boric acid. By the addition of caustic soda OH-ions were introduced; these lowered the H-ion concentration of the zinc sulphate, and thus raised the borate concentration, but at the most only 70 per cent. of the borax in the solution could be precipitated. If the zinc borate is removed by filtration and the filtrate is neutralized with caustic soda, and again precipitated with zinc salt solution, by repeating the process several times 94 per cent. of the borax can be separated from the solution. Only very little borate is formed when

free carbon dioxide is present in the cold saturated borax solution; if sodium carbonate is present the amount of precipitate is increased, but does not reach that obtained with an equivalent quantity of caustic soda. If caustic soda is added to solutions containing soda the solvent action of the zinc carbonate is diminished, and the formation of borate is increased. In borax solutions containing other salts, *e. g.*, NaCl and Na_2SO_4, besides Na_2CO_3, an excess of zinc salt is necessary in order to precipitate the greatest possible amount of borate.—Chem. News, Dec. 30, 1910, 330; from Ztschr. f. Anorg. Chem., *68* (1910), No. 4.

Commercial Perborates—Method of Valuation.—E. Bosshard and K. Zwicky recommend the following method for the valuation of commercial perborates, particularly the sodium salt, which are coming largely into use for a variety of technical purposes:—A weighed quantity of the perborate is introduced into a 100-Cc. flask, and mixed with 3 or 4 times its weight of pure manganese dioxide. A small test-tube containing sulphuric acid, 1:10, is introduced into the flask, which is then fitted to a graduated eudiometer tube. The tube of acid is then inclined so that its contents may react with the mixed powders. When action has ceased, the volume of gas evolved is read off, with the usual corrections for temperature and pressure. Half the oxygen thus liberated is derived from the perborate. Therefore, when a = the weight of substance taken, and b = the volume of oxygen evolved, the percentage of available oxygen = $\frac{16 \times b}{224 \times a}$ at 0° C., and 760 Mm. pressure. If carbonate be present the gas must be washed with sodium hydroxide solution before measurement.—Apoth. Ztg., XXV (1910), No. 53, 509.

SILICON.

Silicon—Brominated and Hydrobrominated Compounds.—According to A. Besson and L. Fournier, when a rapid current of dry hydrobromic acid acts on amorphous silicon heated to a red heat, from the raw product of the reaction the following compounds can be isolated by distillation and subsequent sublimation under reduced pressure:—1. $SiBr_4$. 2. A white crystalline solid fusing at 95°, distilling without decomposition under ordinary pressure at 265°, and having the composition represented by the formula Si_2Br_6. 3. A white crystalline substance of formula Si_3Br_8 fusing at 133°. 4. Si_4Br_{10}, which can be sublimed *in vacuo*, and appears to fuse at 185°; at this temperature it undergoes partial decomposition, leaving a white residue.—Chem. News, Jan. 20, 1911, 36; from Compt. rend., *151* (1910), No. 23.

CARBON.

Calcium Carbide—Use for Determining Moisture.—Irvine Masson observes that in the determination of moisture in pure and in raw materials

the methods which have been in use have generally proved accurate and reliable. Often, however, the material is such that, when it is heated, it gives off vapors other than water; or it may be that some of the water evolved is the result of chemical decomposition; or, again, certain substances gain weight by oxidation when heated in air. In all such cases it is obvious that weighing alone gives results which may lead to considerable error, and other methods must therefore be sought which are free from objection. Such, the author suggests, is afforded by calcium carbide, which is now a commercial article, and overcomes the difficulties mentioned. The great advantage of calcium carbide as a reagent in water determinations may be summed up by saying that, of all substances dealt with in ordinary circumstances, water is the only one which has any chemical action on carbide; and this action is rapid, and generates a gas, whose quantity is readily ascertained and gives a direct measure of the action. The gas in question, acetylene, is produced according to Moissan's well-known equation, $CaC_2 + 2H_2O = Ca(OH)_2 + C_2H_2$.

It is apparent, then, that a good method of water determinations should be obtained by allowing a weighed amount of material to give up its water to excess of carbide, and measuring the acetylene evolved. Such a method is now in use in Australia for the determination of moisture in sheep's wool, and the author mentions a number of instances in which the carbide method would prove of value, these being mainly cases of technical materials whose water content is not easily obtainable by ordinary means; but the particulars of methods and apparatus adopted for a more general application of the carbide method remain to be considered and discussed.—Chem. News., Jan. 27, 1911, 37.

New Metallic Carbonyls—Formation and Properties.—L. Mond, H. Hirtz and M. D. Cowap give in tabular form a *résumé* of the present state of knowledge of the carbonyls. Several new compounds of this class have been prepared by the action of carbon monoxide on the metals at high pressures. *Cobalt carbonyl*, $Co(CO)_4$, is produced when cobalt obtained by reduction of the oxalate is heated at 150° C. with carbon monoxide under a minimum pressure of forty atmospheres. It forms orange crystals, m. p. 51° C. When heated between 51° and 60° C. it decomposes into carbon monoxide and cobalt tricarbonyl, $Co(CO)_3$, which is a black crystalline substance decomposing above 60° C. into cobalt and carbon monoxide. *Iron carbonyls: Ferropentacarbonyl*, $Fe(CO)_5$, is formed in the absence of light at 180–220° C. under a pressure of 150–250 atmospheres. It is a yellow liquid, and when exposed to light gives off carbon monoxide and forms golden crystals of *Diferrononacarbonyl*, $Fe_2(CO)_9$. This substance, when heated in solution to 95° C., forms $Fe(CO)_5$ and *Iron tetracarbonyl*, $Fe(CO)_4$, which occurs in green crystals, decomposed at 140–150° C. into iron and carbon monoxide. *Molybdenum carbonyl*, $Mo(CO)_6$,

is produced at 200° C. under a minimum pressure of 130 atmospheres. It forms white crystals, which decompose when heated to 150° C. *Ruthenium carbonyl* has been obtained at 300° C. under a minimum pressure of 400 atmospheres, but in quantities too small for analysis. Negative results were obtained with manganese, chromium, tungsten, palladium, and rhodium.—Pharm. Journ. and Pharmacist, Jan. 7, 1911, 9; from Journ. Chem. Soc., 1910, 798.

Carbon Dioxide—Action on Litmus.—McCallum Fairgrieve directs attention to the inaccuracy of a common statement in elementary text-books describing the action on litmus of carbon dioxide in solution. It is generally stated, he says, that the action of carbon dioxide is to turn litmus "wine-red," while the fact is that carbon dioxide dissolved in distilled water turns neutral litmus red, just like any other acid. The cause of the wine-red color usually obtained is the presence of alkaline bicarbonates as impurities. That this is the case can be seen by adding a drop of ammonia or sodium carbonate solution to the carbon dioxide solution, when the color changes, first, from red to blue, and then, after an interval which depends on the amount of alkali added, to the wine-red usually associated with the action. A weak solution of lime water acts similarly, and this would seem to give the genesis of the error, as, if hard waters are used to make up the solutions, the wine-red color is produced.—Pharm. Journ. and Pharmacist, Sept. 2, 1911, 325; from Nature, Aug. 17, 1911, 215.

Carbon Dioxide—Solubility in Beer.—It has been stated that carbon dioxide is more soluble in beer than in the corresponding water-alcohol mixture, the increased solubility being ascribed to the presence of the colloidal substances in beer. It is now known that colloidal solutions do not dissolve gases so well as water, and this is confirmed in the case under consideration by the experiments of A. Findlay and B. Shea, who find that carbon dioxide is less soluble in beer than in the corresponding dilute alcohol. The erroneous results of previous experiments are ascribed by the authors to super-saturation.—Pharm. Journ. and Pharmacist, June 24, 1911, 844.

Coal—Bacterial Influence on Spontaneous Ignition.—E. Galle, in order to determine whether the spontaneous ignition of coal is due to the action of bacteria, submitted various specimens of coal to bacteriological investigation under aerobic and anaerobic conditions. Of seven species of bacteria isolated, four (*Bacillus nacraceus*, *B. subtilis*, *B. mesentericus*, and *B. pseudosubtilis*) were found to be capable, when grown on a suitable nutrient medium, of producing a combustible mixture of gases, which burned with a faint blue flame. The composition of the gas mixture was found to be: Carbon dioxide, 5.4 to 27.3 per cent.; methane, 71.5 to 84.8 per cent.; while traces of oxygen, heavy hydrocarbons, and carbon monoxide were found in the gas mixture produced by *B. nacraceus* and

B. pseudosubtilis, and that in quantity not exceeding 3 per cent. The isolated bacteria possess the power of producing heat, but it is shown at the same time that, while bacterial activity alone is not responsible for the spontaneous combustion of coal, it plays an important rôle in the phenomenon.—Pharm. Journ. and Pharmacist, June 3, 1911, 741; from Chem. Zentralbl., Jan. 4, 1911, 48.

CYANOGEN.

Cyanogen—Detection of Small Amounts.—George Lockemann suggests the following method for the detection of small amounts of cyanogen: The substance is mixed with dilute sulphuric acid and heated. The tube in which it is heated is closed by a piece of filter-paper which has been soaked in caustic potash or soda. The HCN evolved if CN is present is absorbed by the caustic potash, and if ferrous sulphate solution is added after a short time the greenish precipitate of ferrous hydroxide becomes brown owing to the formation of ferric hydroxide. On the addition of hydrochloric acid and water-vapor the characteristic Berlin blue appears. Cyanogen can also be detected by the rhodan-test. The filter-paper in this case is treated with ammonium sulphide. The paper is exposed to the fumes from the solution to be tested, and is then acidified with hydrochloric acid. The appearance of a red coloration on the addition of ferric chloride solution shows the presence of cyanogen.—Chem. News., Dec. 9, 1910, 293; from Ber. d. D. Chem. Ges., *43* (1910), No. 14, 2117.

Hydrocyanic Acid—Occurrence in the Genus Thalictrum.—E. van Italic has examined the seeds of a large number of species of the genus *Thalictrum*, but has only found two of them to yield hydrocyanic acid, namely *Thalictrum aquilegifolium* and *T. angustifolium*. The first mentioned was very thoroughly examined. Both the white-flowered and the red-flowered variety yielding hydrocyanic acid in all parts of the plant the leaves, stems, petioles, flowers, seeds and roots. The fresh leaves of the white-flowered variety yielded 0.03 per cent.; those of the red-flowered 0.024 per cent. This yield, however, varied with the maturity of the plant. The young leaves gathered in September from plants cut down in July yielded as much as the young portions gathered in June, while the yellow autumnal leaves yielded practically none. A much higher yield was however obtained—up to 0.053 per cent. after twenty-four hours maceration then when the material was directly distilled, and about twice as much hydrocyanic acid was formed if emulsin was added. Thus, leaves of the red flowering variety gathered in June yielded on direct distillation 0.022 per cent. after twenty-four hours maceration 0.051 per cent., and after treatment with emulsin 0.101 per cent. of hydrocyanic acid. The glucoside yielding the acid is probably allied to "linamarin," but has not yet been isolated.—Arch. d. Pharm., *248* (1910), 251.

Hydrocyanic Acid—Source in Plants.—A. Jorissen has for many years been investigating the phenomena of the formation of hydrocyanic acid in plants, and in 1891 isolated the cyanogenetic glucoside linamarin from germinating linseed. His own investigations and those of others go to show that this formation of prussic acid may occur at the expense of nitrites or of nitric acid and organic compounds, and he has recently found that this actually occurs at low temperatures, when dilute nitric acid is allowed to react for a length of time on many substances which occur naturally as plant constituents. Thus, morphine, strychnine, and especially vanillin, yield notable and increasing amounts of hydrocyanic acid when left in contact with 6.3 Gm. of nitric acid in 100 Cc. of water, for several days. The formation of the acid takes place in the dark as well as in the light.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 664; from Bull. Acad. Roy. Belg., 1910 (4), 224, through Journ. de Pharm. et Chim., 1910, 2, 358.

Hydrocyanic Acid—New Quantitative Estimation in Vegetable and Animal Tissues.—In a paper read before the Royal Society in June, A. D. Waller describes in detail a colorimetric method for the estimation of hydrocyanic acid, depending on the reaction between potassium cyanide and picric acid, which was first studied by Hlasiwetz, and recently applied by Guignard to the detection of minute quantities of hydrocyanic acid, and by E. F. Armstrong to the rapid detection of emulsin. The color-scale was prepared by mixing equal volumes of a recently titrated solution of $\frac{1}{10,000}$ hydrocyanic acid and of picrate mixture (equal volumes of $\frac{0.5}{100}$ picric acid and $\frac{5}{100}$ sodium carbonate). From this stock solution (T 50), after twenty-four hours in an incubator at 40° C., a color-scale was prepared by further dilution with picrate mixture, to contain, e. g., 1, 2 and 3, etc., parts of HCN per million, of tints T 1, T 2, T 3, etc. The estimation was made by matching the color of the given fluid or of its distillate into picrate mixture (after suitable dilution if required) with that of the color-scale. Thus, if the tint of a distillate from 10 Cc. of blood (dil. × 5) into 25 Cc. of picrate was found to equal T 5, and the volume of picrate + distillate was 40 Cc., the amount of HCN in the distillate was 5×40 millionths Gm., i. e., 0.000200. A second distillation showed whether or not the whole of the HCN present had been taken over in the first distillate.—Pharm. Journ. and Pharmacist, July 16, 1910, 71.

Hydrocyanic Acid—A New Test.—At a meeting of the South African Chemical, Metallurgical and Mining Society, at Johannesburg, Dr. J. Moir demonstrated a new and extremely sensitive test for hydrocyanic acid. This depends on the oxidizing action produced when a cupric salt is added to prussic acid (owing to reduction to cuprous cyanide), which is manifested in the presence of an organic compound oxidizing to a colored compound—the more sensitive one being *hydrocoerulignone*. The test is

sensitive to something like 1 part in 5,000,000 parts of water, but unfortunately the reagent is rather unstable. Other oxidizable substances of the same class will answer, however, although not so sensitive, and some of these, like *benzidine*, keep much better. In very dilute solutions an instantaneous orange color is obtained with hydrocoerulignone, and in stronger solutions a red precipitate of coerulignone which possesses a violet lustre. If benzidine is used, the color obtained is indigo-blue.—Chem. News, July 8, 1910, 17.

Hydrocyanic Acid—Method of Successfully Applying Vortmann's Nitroprusside Test.—H. J. von Giffen states that the success of Vortmann's nitroprusside test depends on the strength of the alcohol which may be present and upon the sodium prusside; the temperature of the substance has also an influence, the lower this is (about 4° C.) the sharper the reaction. The author proceeds in the following way: In one part of the alcoholic distillate a few particles of sodium nitrite are dissolved, and two or three drops of ferric chloride solution are added; the liquid is shaken and carefully acidified with dilute sulphuric acid added drop by drop, so that a clear yellow solution results. The liquid is heated to the boiling point, cooled, the excess of iron precipitated with ammonia, filtered, the filtrate is evaporated to dryness, and the dry residue taken up with water. The solution is cooled on ice, and a drop of ammonium sulphide added, whereupon a violet coloration results which changes more or less quickly, according to the cyanide content, into blue, green and yellow. It is important that all the iron is precipitated, otherwise the color effect will be vitiated.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 664; from Pharm. Weekbl., 1910, No. 39, 1043.

Hydroferro-and Hydroferricyanic Acids—Methods of Determination.—Two methods of determining hydroferro-and hydroferricyanic acids are in use—the one titration of the aqueous solution with permanganate, the other an iodometric method. Erich Mueller and Otto Diefenthaler have investigated the different modifications of these methods, and have found that de Haen's method of titration with permanganate gives accurate results, and that the determination of hydroferricyanic acid with permanganate after reduction with ferrous sulphate is also accurate. Rupp and Schiedt's process for determining hydroferrocyanic acid by the addition of excess of iodine solution and back titration of the excess with thiosulphate in alkaline bicarbonate solution gives values which are 1 to 2 per cent. too low. The determination of hydroferricyanic acid by Mohr's method gives satisfactory results if it is performed as follows;—About 0.7 Gm. of ferricyanide is dissolved in 50 Cc. of water, 3 Gms. of potassium iodide are added, and 1.5 Gm. of zinc sulphate free from iron, and the iodine is titrated at once, after shaking with $\frac{1}{20}$-N-thiosulphate solution and starch. If the solution of ferricyanide is acid it must be neutralised.—

Chem. News, Nov. 4, 1910, 234; from Ztschr. f. Anorg. Chem., *67* (1910), No. 4.

Potassium Ferro- and Ferricyanide — Iodometric Estimation.—Dr. Mecklenburg finds that both red and yellow prussiate of potash may be estimated very satisfactorily and accurately by an iodometric method of titration, depending on reduction with potassium iodide in presence of a zinc salt and titration of the liberated iodine with thiosulphate. To make the method available for the ferrocyanide, this must first be oxidized with potassium permanganate. The latter may also be accurately and conveniently estimated by oxidizing the salt with an excess of $\frac{N}{10}$ permanganate and ascertaining the excess of permanganate used iodometrically—the quantity consumed forming the basis for calculating the amount of ferrocyanide. By combining both methods, applying the first before oxidation and the second method afterwards, the content of both ferro- and ferricyanide may be estimated in their admixtures.—Pharm. Ztg. lv (1910), No. 73, 735; from Ztschr. anorg. Chem. *67* (1910), 322–338.

ALKALIES.

Alkalimetry—A Sensitive Indicator from Radish Peels.—According to Dr. J. F. Sacher the peels of fresh (red) radishes contain a coloring matter which serves as an extremely sensitive indicator in alkalimetry. On extracting the fresh peels with 95 per cent. alcohol, a perfectly neutral onion-red solution is obtained, which is sensitive both to acids and alkali—producing a red color with acids, of greater intensity than that produced with methyl orange, and a green color with alkali, or blue in greater concentrations. The new coloring matter is more sensitive than either methyl orange or phenolphthalein, and, like litmus and phenolpthalein is also sensitive to carbonic acid. In general, its color reactions with acids and alkalies are comparable with those of tincture of huckleberries.—Pharm. Ztg., lv (1910), No. 100, 1010; from Chem. Ztg., 1910, No. 134.

A New Indicator for Alkalimetry is also described by R. Mellet, who found in the course of a research in which *β-Naphtholazo-m-Oxybenzoic Acid* was prepared, that this substance gave a violet color with alkalies and a red with acids. The alkali salts are soluble in water, but the acid itself is precipitated very quickly after being liberated, and is therefore not suitable for use as an indicator. A sulpho-derivative of this, however, 6-sulpho-β-naphtholazo-m-oxybenzoic acid, was found to be soluble in acid or alkali, and to possess some important advantages as an indicator. When dissolved in water this gives a strong red solution, or orange-red if the solution is very dilute: alkali changes the color instantly to a dark violet, but large excess of alkali gives a cherry-red color with it, and for this reason the indicator is not suitable for use in the form of paper, except for acids and very dilute alkalies. In the form of solution

the indicator is very suitable for use in titrating acids or alkalies, on account of its strong color and its great sensitiveness, in which it is superior to any other but phenolphthalein. It answers for all mineral acids and most organic acids and for all bases, including ammonia; it is much less affected by dilution of the liquid than either methyl orange or litmus. A series of titrations with centinormal solutions was made, using respectively litmus, methyl orange, and the new indicator, and noting in every case the points at which the indicator showed the change from acid to an intermediate shade, and from this to alkaline; also the corresponding points when the direction of change was reversed. It was found that with litmus as indicator, the amount of $\frac{N}{100}$ solution that was added after the first change and before the second, was from 0.4 to 0.7 Cc. (according to the dilution), when alkali was added to acid, and from 0.75 to 1.6 Cc. when acid was added to alkali; with methyl orange as indicator, the amount added between the two changes was from 0.7 to 2.5 Cc. in the first case, and from 0.45 to 1.8 Cc. in the second; whereas with the new indicator the amount of $\frac{N}{100}$ solution was only from 0.2 to 0.3 Cc. when alkali was added to acid, and from 0.1 to 0.2 Cc. when acid was added to alkali. The end-point shown by 6-sulpho-β-naphtholazo-m-oxybenzoic acid is the same as that indicated by phenolphthalein when titrating alkali into acid; it is extremely sharp and well-marked, and is practically the same for both directions of the change.—Pharm. Journ. and Pharmacist, Jan. 28, 1911, 97; from Chem. Ztg., Oct. 11, 1910, 1073.

Sodium and Potassium—Action on Water.—M. Banerjee finds that when a small piece of either sodium or potassium is thrown on water, the distinction between the two reactions is very clear. Potassium acts more violently than sodium, giving indications of more energy in combining with the water. Sodium, on water, forms a round symmetrical globule—not so potassium. Sodium moves briskly too and fro, but potassium does not. With sodium no yellow flame is visible until it is brought to a standstill, while in the case of potassium the hydrogen evolved ignites with a violet flame at once. The author concludes, from many experiments made, that the true cause of the brisk movement on water in the case of sodium is the low vapor density (11.5), its low molecular volume (24), as well as the low density and molecular volume of Na_2O (23 and 22.1), and of NaOH (2.13 and 18.5); these factors, in the case of potassium, are 19.5, 45.2, 2.8, 35.5, 2.19, 27 respectively. When either metal is thrown on water the hydrogen evolved from all sides is generally, as is indicated by the color of the flame, charged with the vapors of the metals, and hence the densities of these vapors are responsible for their motion to and fro over the liquid. The metals themselves remain, owing to the great amount of heat generated in the reaction, in the spheroidal state, and hence easily capable of being set in motion by any other force. In the case of potassium, the high density and much larger molecular volume

of its vapor counteract the motion of the hydrogen evolved from all sides, and hence its movement is considerably retarded. The great amount of heat which is liberated is thus prevented from being dissipated, and, therefore, it bursts into flame. In case of sodium the density, etc., being very low, the hydrogen evolved keeps it in a state of motion, the heat generated becomes thus dissipated, and hence the gas does not ignite.—Chem. News, Dec. 30, 1910, 319.

Potassium—Novel Method of Detection.—L. T. Bowser describes the following novel method of detecting potassium: Place 5 Cc. of the potassium solution in a tall beaker of 50-Cc. or 100-Cc. size, set on a mirror beside it 5 Cc. of pure water in a similar beaker, and add to each 2.5 Cc. of sodium cobaltinitrite reagent and 5 Cc. of 95 per cent. alcohol. If upon looking down through the solutions into the mirror an equally sharp image of the observer can be seen in each beaker there is no potassium present; if the test solution shows a dimmer image than the blank, potassium is present amounting to two or more parts per million. The only precautions necessary are to avoid making the test in an atmosphere dense with ammoniacal fumes, to be certain of the absence of ammonium from the solution, and to be certain that the solution is neutral or slightly acid with acetic acid. It appears that any solution may be tested directly for potassium without removing anything save ammonium. Should the solution be alkaline, it should be made acid as indicated above, while if a free acid, other than acetic acid, be present in the solution, it should be neutralized by means of sodium hydroxide and then made slightly acid with acetic acid. Tall, narrow beakers with smooth, flawless bottoms should be used. The sodium cobaltinitrite solution is made by dissolving 100 Gms. of sodium nitrite in about 200 Cc. of distilled water, adding 60 Cc. of 30 per cent. acetic acid and 10 Gms. of cobalt nitrate—$Co(NO_3)_2,6H_2O$. Let the mixture stand for a day or two, filter, and dilute to 400 Cc.—Pharm. Journ. and Pharmacist, Oct. 21, 1911, 528; from Journ. Amer. Chem. Soc., Oct., 1911, 1566.

Potassium Hydroxide—Preparation and Preservation of Alcoholic Solution.—The observations of Dr. R. Gaze lead him to the conclusion that the "yellowing" of alcoholic solutions of KOH is primarily attributable to the partial or complete exclusion of light, the correct method of preparation being, of course, also important. He recommends that 66 Gm. KOH (purified by alcohol) be dissolved in a liter flask in 66 Gm. water and the solution allowed to cool; then, rotating the flask gently, to gradually add absolute alcohol to the mark, shake well, and allow to stand 24 hours. Now filter, and having established the "titre," preserve the solution in colorless glass and *in the light.* So prepared and preserved the solution retains its "titre" very satisfactorily.—Apoth. Ztg., xxv (1910), No. 71, 668.

Lithium Carbide—Difficulties in its Preparation.—S. A. Tucker and H. R. Moody point out that the preparation of lithium carbide is attended with great difficulty, and point to the small temperature interval between its formation and decomposition. The method giving the best results was that in which a mixture of lithium carbonate and carbon in molecular proportions was heated in a graphite crucible in an electric furnace. The best conditions are found between 11.45 minutes, 210 amps., 18 volts, and 12.1 minutes, 700 amps., 30 volts. That is, the heating must be slow and the final high temperature of short duration. The product obtained, however, was neither uniform nor pure; the yield averaged not much over 25 per cent. of the theoretical carbide. Lithium carbide attacks almost any material with which it is heated—porcelain, alundum, graphite, and even iron are corroded, the latter withstanding its action best. It fixes nitrogen, but in a proportion not differing greatly from that obtaining in the case of "nitrolime," the time necessary for fixing, however, is much less. Further, the nature of the nitrogen compounds formed appears to differ considerably from those obtained when nitrogen is absorbed in calcium carbide.—Pharm. Journ. and Pharmacist, Oct. 21, 1911, 528; from Journ. Amer. Chem. Soc., Sept., 1911, 1478.

Lithium—A Constant Constituent of Natural Vichy Water and Salts.—M. A. Mallat observes that natural vichy water, and the genuine salts obtained by its evaporation and conversion into bicarbonates by exposure to carbon dioxide, invariably contain lithium, in traces, but sufficient to give a very marked and characteristic spectrum. Certain samples of the water purchased in Paris failed to give this reaction, and were fictitious. The synonym "Sel de Vichy" for pure sodium bicarbonate given in the French Pharmacopæia is, therefore, inaccurate and misleading. Genuine natural Vichy salts should contain lithium.—Pharm. Journ. and Pharmacist, Jan. 21, 1911, 65; from Journ. de Pharm. et Chim. 1910, *2*, 543.

Free Ammonia and Ammonium Carbonate—Method of Estimation by Titration when Associated.—J. C. Tomlinson says that in estimating free ammonia and ammonium carbonate in solutions containing an excess of the former a quick volumetric method may be used. Free ammonia cannot be titrated using phenolphthalein as an indicator, methyl-orange being usually used; however, when it exists in the free state, and as carbonate, by using phenolphthalein first, and titrating until the liquid assumes a transient pink coloration throughout its entire bulk, we can obtain a close approximation as to the amount of ammonium carbonate present, and then adding methyl-orange and completing the titration, estimate the total ammonia. To prove this a solution was made containing 0.78 Gm. free ammonia, NH_3 per 100 Cc., and 3.69 Gm., ammonium carbonate, $(NH_4)_2CO_3$, per 100 Cc. To 10 Cc. of this solution phenolphthalein was added, and when titrated with normal sulphuric acid as the

mean of two experiments, 8.1 Cc. $N.H_2SO_4$ were required. Calculated as ammonium carbonate, $(NH_4)_2CO_3$, this represents 3.42 Gm. $(NH_4)_2CO_3$ per 100 Cc. The total ammonia free and existing as carbonate in the test solution made above, would be, by calculation, 2.16 Gm. per 100 Cc. A further titration after adding methyl-orange to 100 Cc. of the liquid already titrated for carbonate gave the total amount of normal sulphuric acid solution required as 12.5 Cc., representing 2.1 Gm. total ammonia, NH_3, per 100 Cc. Methyl-orange commonly used as an indicator for the titration of free ammonia, although not feasible as an indicator in the presence of free carbon dioxide, can hence be used when there is an excess of ammonia in ammonium carbonate solutions, and the reliability of the titration for carbonate for quick and approximate analysis may be judged from the figures given above.—Chem. News, Jan. 13, 1911, 13.

ALKALINE EARTHS.

Barium, Strontium and Calcium—Quantitative Separation and Estimation.—V. d. Horn and v. d. Bos describe a new method for the quantitative separation of barium, strontium and calcium, which is adaptable both for their gravimetric and volumetric estimation in their admixtures. The dilute solution is acidulated with acetic acid and the barium precipitated with excess of ammonium chromate, the barium chromate being collected in a filter, washed, dried and weighed. From the filtrate the strontium chromate is precipitated quantitatively by 50 per cent. alcohol, and in the filtrate from this the calcium is quantitatively precipitated as oxalate. The details of the volumetric method, based upon the reactions described, must be consulted in the original abstract.—Pharm. Weekbl., 1911, 5, through Pharm. Zentralh., lii (1911), No. 30, 798.

Barium Sulpharsenate—Preparatiou and Properties.—According to Emanuel Glatzel, normal barium orthosulpharsenate can be prepared by the action of barium sulphhydrate on arsenic pentasulphide, obtained by adding sulphuretted hydrogen to a solution of arsenic acid containing hydrochloric acid, the sulphuretted hydrogen being always present in excess. The formula is $Ba_3As_2S_8+6H_2O$, and the substance forms large pale yellow needles, which are transparent like glass. It is difficultly soluble in water, undergoing decomposition. On warming it gives up its water of crystallization, and turns first lemon-colored and then light brown, and on being heated in air it gives off white fumes and leaves behind a white residue.—Chem. News, June 30, 1911, 312; from Ber. d. Chem. Ges., *43* (1911), No. 6.

Calcium—Determination of Minute Quantities in Presence of Much Magnesium.—C. Liesse recommends a method for the determination of minute quantities of calcium in presence of much magnesium, which depends upon precipitating the calcium as oxalate in solutions so dilute as to

keep the magnesium oxalate dissolved. From 1 to 2 Gms. of the substance is treated with 20 to 25 Cc. of hydrochloric acid, then diluted to 100 or 200 Cc. with water, and made just alkaline to phenolphthalein with ammonia. Insoluble matter is then removed by filtration; the filtrate is diluted to 1500 Cc. for each gramme of substance taken, this dilution being made in the cold. Ammonium oxalate crystals, 4 Gms., is then added. and sufficient acetic acid to give an acid reaction. After standing two hours, with occasional agitation, the liquid is filtered and the precipitate is washed thrice with 150 Cc. of hot water. The precipitate is then gently ignited, and weighed as calcium carbonate. Although the volume of liquid required to be filtered is considerable, filtration is very rapid.—Pharm. Journ. and Pharmacist, March 4, 1911, 297; from Annal. Chim. Analyt., *16* (1911), 7.

Lime—Where Does the Average Druggist Get It?—The question, "Where does the average druggist get his lime?" occurred to Prof. Chas. H. LaWall as being of some importance and interest, and this may be coupled with another: "How does the average druggist test his lime water?" Accordingly he submitted the question to twelve prominent pharmacists. The answers to the first were as follows: Get it anywhere I can (1). Use selected building lime (1). From the nearest building operation (2). Send to the lime dealer (1). Use lime put up for the purpose (2). Use ——'s lime (5). The answers regarding the testing of lime water were: Do *not* test it (6). Taste it (3). Test by blowing in through a soda straw (1). Add sol. ammon. carb. and note bulk of precipitate; also taste (1). Titrate by U. S. P. method (1). The author explains that ——'s lime is a very fine form of calcium oxide put up in vials containing sufficient lime to make one gallon of full-strength lime water when used according to directions. He adds furthermore that out of 300 samples of lime water examined several years ago, 181 proved to be below the U. S. P. standard, many of them less than half or even one-fourth the official strength.—Proc. N. J. Pharm. Assoc., 1911, 93–95.

Metallic Strontium—Preparation and Properties.—B. L. Glascock contributes an interesting paper on the preparation and properties of metallic strontium. Of the various methods tried to obtain this metal in sufficient amount to admit of a thorough study of its properties, the electrolysis of the fused chloride was the most promising, and the author has found that this is actually the case. In a suitable iron vessel, with an electrolyte of pure strontium chloride and a current of 125 ampères and 40 volts for seven hours, 76 Gms. of metallic strontium was obtained; but the best percentage yield was when a current of 135 ampères and 35 volts was passed for only two hours. Strontium is a very light soft metal of a silver luster when a new surface is first exposed, but this quickly changes to a yellowish tint and finally to a white non-lustrous surface as the layer

of oxide forms over it. It is harder than sodium, but softer than calcium, and can be cut easily with a knife. It reacts with water, methyl and ethyl alcohols, and various other organic compounds with evolution of hydrogen. It alloys with iron, and dissolves very easily in liquid ammonia, giving a deep blue solution from which a dark blue precipitate separates as more metal dissolves. As the ammonia evaporates from the precipitate the latter shows a brilliant display of colors. It burns in an atmosphere of carbon dioxide and illuminating gas as easily as in air, but not so violently as calcium under similar conditions. Hydrogen and nitrogen unite with the heated metal when they are passed over it, forming the hydride and nitride respectively. The hydride reacts more energetically with water and alcohol than does the metal. Its specific gravity (in dry toluene) is 2.55.—Pharm. Journ. and Pharmacist, Dec. 24, 1910, 761; from Journ. Amer. Chem. Soc., Oct., 1910, 1222.

Crystallized Strontium—Method of Preparation.—A. Guntz and M. Galliot obtain crystallized strontium by the following process:—Finely powdered strontia is mixed with aluminium in the proportion given by the equation $3SrO+Al_2=3Sr+Al_2O_3$. It is then heated in a steel tube to 1000°, and a vacuum is made in the porcelain tube in which it is placed and thus about 75 per cent. of the strontium used is obtained in the crystalline form.—Chem. News, Jan. 6, 1911, 12; from Compt. rend., *115* (1910), No. 19.

Magnesium Aluminate—Production and Use for Producing Pure Caustic Soda Solution.—In the course of experimental work with an aluminate of sodium, J. Connor Chisholm found that the addition of magnesium oxide resulted in the complete decomposition of the sodium aluminate, leaving pure sodium hydroxide in solution and precipitating the alumina in combination with the magnesia. Analysis of the precipitate determined it to have the definite composition $Al_2(O_2Mg)_3$. By using the calculated theoretical quantity of magnesium oxide, the alumina is completely precipitated from the sodium aluminate solution, with production of a pure caustic soda solution, which, in the author's opinion, would be an ideal one for use by the new Pharmacopœia.—South. Pharm. Journ., July, 1910, 483.

Magnesium Peroxide—Commercial Quality and Methods of Examination.—F. Lemaire directs attention to the variable quality of magnesium peroxide, which has during the last five or six years obtained considerable vogue in therapeutics. In all its applications the principal object in employing it is to obtain the nascent oxygen, and it is therefore important to ascertain the amount of oxygen available in any given sample. Analysis of a number of commercial specimens showed very great variations in this respect. The test employed was to add 0.25 Gm. of the substance to 10 Cc. of diluted sulphuric acid (10 per cent.) and titrate with $\frac{N}{10}$ per-

manganate; the results so obtained were checked by another series of tests, in which 0.25 Gm. was treated with 25 Cc. of $\frac{N}{10}$ permanganate and 10 Cc. of diluted sulphuric acid, then 25 Cc. of $\frac{N}{10}$ oxalic acid added, and the excess titrated with permanganate; also by a third series, in which the peroxide was added to solution of potassium iodide, the liquid acidified with sulphuric acid, and the liberated iodine titrated with thiosulphate. Concordant results were obtained by all three methods; 1 Cc. of $\frac{N}{10}$ solution = 0.0028 Gm. of real peroxide, MgO_2. Ten commercial samples gave results indicating from 2.35 to 26.88 per cent. of MgO_2, the average of all being 13.52 per cent.—Pharm. Journ. and Pharmacist, July 16, 1910, 71; from Bull. Soc. de Pharm. de Bordeaux, 1910, 56.

Dried Magnesium Sulphate—Proposed Definition of Standard.—W. A. Puckner and L. E. Warren, from an examination of a number of different commercial samples of "dried magnesium sulphate," conclude that this salt as found on the American market is far from uniform in composition, and propose the definition of a standard suitable for inclusion with the standards of unofficial drugs and chemical products in course of preparation by a committee of the A. Ph. A. appointed for the purpose, which, in part, is as follows:

Magnesii Sulphas Exsiccatus—Dried Magnesium Sulphate.—Magnesium sulphate dried at 100° C. corresponding to from 77.5 to 81.5 per cent. absolute magnesium sulphate.

Dried magnesium sulphate may be prepared by heating (with stirring) 100 parts of crystallized magnesium sulphate in a tared porcelain dish in a drying oven first at a temperature of 60° to 70° C., and then at a gradually rising temperature until the substance has lost from 37 to 40 per cent. of its weight.

A fine white powder, without odor, and having a cooling, saline, bitter taste. It is almost completely soluble in water; when exposed to air it absorbs moisture, etc., etc.—Amer. Journ. Pharm., June, 1911, 621–625.

Formate of Beryllium—Preparation and Properties.—According to S. Tanatar, when beryllium carbonate is dissolved in formic acid the normal formate is obtained. It is insoluble in organic solvents. It is more or less hydrolized by boiling in aqueous solution and is partially decomposed when heated under diminished pressure, a basic salt, $Be_4O(CHO_2)_6$, subliming. The same basic salt is obtained by boiling an aqueous solution of the normal formate with the calculated amount of beryllium carbonate.—Chem. News, July 1, 1910, 12; from Ber. d. D. Chem. Ges., *43* (1910), No. 7.

EARTHS.

Aluminium Hydroxide—Precipitation in Granular Form.—W. E. Taylor obtains a granular precipitate of aluminium hydroxide as follows:—To the solution containing the aluminium, instead of boiling as in the

ordinary way before adding the ammonium hydrate for precipitation, insert a thermometer, and precipitate at a temperature of 66° C., subsequently boiling as usual. By doing this it will be found that, instead of having a gelatinuous precipitate difficult to filter off, the aluminium will have been precipitated in a granular form which filters rapidly and freely. —Chem. News, April 13, 1911, 169.

Aluminium Sulphide.—Preparation and Properties.—According to the experiments of Wilhelm Biltz and Fritz Caspari, when a mixture of powdered metallic aluminium and sulphur is covered with fused sulphur in a crucible and ignited by means of a magnesium ribbon, a violent reaction occurs and a crystalline mass is left in the crucible. This raw product may be purified by sublimation. Al_2S_3 crystallizes hexagonally. Its specific gravity is 2.02, and its melting-point is 1100+10°. The authors have confirmed the existence of Regelsberger's monosulphide of aluminium.—Chem. News, Sept. 29, 1911, 162 ; from Ztschr. f. Anorg. Chem., *71* (1911), No. 2.

Alum.—Solubility in Water and in Glycerin.—Experiments made by Thomas Dunlop to determine the cause of crystallization of alum from a solution in water and glycerin, either of which solvent was sufficient by itself to hold the alum in solution, showed that the addition of glycerin to the aqueous solution was responsible for the crystallization, and that, reciprocally, water will cause the separation of alum from its solution in glycerin.—Pharm. Journ. and Pharmacist, July 2, 1910, 6.

RARE EARTHS.

Rare Earths—Some New Compounds.—L. A. Pratt and C. James, while searching for some crystalline compounds which might be useful for fractional crystallization of the yttria earths, prepared and describe a number of salts which may here be mentioned by their titles and chemical composition :

Yttrium methyl sulphonate, $Y(CH_3SO_2O)_3.4H_2O$.

Yttrium methine trisulphonate, $Y_2[CH_2(SO_2O)_2]_3.2\frac{1}{2}H_2O$?.

Yttrium ethyl sulphonate, $Y(C_2H_5SO_2O)_3.4H_2O$.

Yttrium camphor sulphonate, $Y(C_{10}H_{15}OSO_2O)_3.7H_2O$.

Yttrium oxmethyl sulphonate (not obtained in crystalline form).

Yttrium salicylate, $Y[C_6H_4(OH)COO]_3.3\frac{1}{2}H_2O$.

Yttrium phthalate, $Y_2[C_6H_4(COO)_2]_3.3H_2O$.

Yttrium glycollate, $Y(CH_2OHCOO)_3.2H_2O$.

Yttrium phenyl acetate, $Y(C_6H_5.CH_2COO)_3.H_2O$.

Yttrium phenoxyacetate, $Y(C_6H_5OCH_2COO)_3.3\frac{1}{2}H_2O$.

The phenoxyacetates of Samarium (Sm), Neodymium (Ne), Praseodimyum (Pd), Lanthanum (La), and Cerium (Ce) were also prepared in exactly the same manner as the yttrium salts, but were much more insol-

uble than the latter and therefore could not be recrystallized from water. Regarding

Thorium phenoxyacetate, the author found that by working with a neutral solution of thorium, the thorium was almost quantitatively precipitated on the addition of an excess of phenoxyacetic acid. The other rare earths are not thrown out of solution, even though a great excess of acid be added. This reaction of phenoxyacetic acid on *neutral thorium* solution, therefore, affords a method for the separation of this element from the rare earths.—Chem. News, Oct. 30, 1911, 177–178.

Celtium—A New Element Accompanying Lutecium and Scandium.—G. Urbain announces the discovery of a new element which existed in the mother liquors accumulated from the successive cystallization of the rare earths obtained from gadolinite, while engaged in the preparation of a good supply of the new element lutecium for the purpose of its further study. He has named this new element, about the identity of which there is no doubt, *Celtium*, with the symbol Ct. corresponding to it. While he has so far only obtained it in a highly concentrated state, he has determined its position in the spectrum and compared it with those of lutecium, xenotime, neoytterbium, and scandium. The chloride of the new earth is rather more volatile than that of lutecium, but less volatile than chloride of scandium. The hydroxide is a weaker base than lutecium oxide, and a stronger base than scandium. In its other characteristics this earth shows an equal resemblance to lutecium and scandium.—Chem. News, Febr. 17, 1911, 73; from Compt. rend., *152* (1911), 141.

Scandium—Characters and Composition of Different Salts.—In continuation of his paper on scandium published in 1908 (in Proceedings 1909, 263–265), and in consideration of the observations since made by G. Eberhard and verified by Prof. R. J. Meyer, that scandium must be one of the most widely distributed earth elements, Sir William Crooks contributes a voluminous paper in which he gives the results of his examination of authentic minerals from the locality whence the "wiikite" used in his previous experiments was mined. These were received from Dr. Wahl, of the Mineralogical Institute, University, Helsingfors, and are described, with the results of the author's investigation as follows:

No. 1. *Felspar* from Lokasaari from the pegmatic vein carrying monazite and the scandium wiikite: contained 1.11 per cent. of rare earths, and gave a photographic spectrum showing only a faint trace of scandium.

No. 2. *Monazite* from Lokasaari, contained 17.5 per cent. of rare earths, but the photographic spectrum showed no scandium.

No. 3. *Black Wiikite* from Lokasaari (Impilaks), contained 22.58 per cent. of rare earths, the spectrum showing considerable quantities of scandium.

No. 4. *Brown Wiikite* from Lokasaari, contained 23.77 per cent. of rare earths, but the spectrum showed only a small amount of scandium.

No. 5. *Wiikite* from Lokasaari (another specimen), contained 24.85 per cent. of rare earths, the spectrum showing considerable quantities of scandium.

No. 6. *Mica* from Huntilla (Impilaks), contained 0.63 per cent. of rare earths, which contained an amount of scandium about equal to that in the rare earths of No. 3 and 5.

From scandia (prepared from this material) in which chemically no other earth could be detected, though the spectroscope revealed mere traces of yttria and ytterbia, the author prepared and describes a number of salts, which can here be mentioned only by their titles and composition, namely:

Scandium Iodate, $Sc(IO_3)_3 + 18H_2O$; *Scandium Sulphite*, $Sc_2(SO_3)_3$; *Scandium Aurochloride*, $3ScCl_3$, $2AuCl_3$, $21H_2O$ (also hydrates with $2H_2O$, and $8H_2O$ respectively); *Scandium Platinocyanide*, $Sc_2(Pt[CN]_4)_3 + 21H_2O$; *Scandium Monochloroacetate*, $(CH_2ClCOO)_2$ ScOH $+ 2H_2O$; *Scandium Lactate*, $(CH_3.CHOH.CoO)_3Sc + 6H_2O$; *Scandium Malonate*, $CH_2.COO.COO.Sc(OH)$ (also the mono- and dihydrate and the basic salt); also the following salts from which the chemical formulas are here omitted on account of their complexity: *Scandium Malate*, *Fumarate*, *Tartrate*, *Racemate*, *Laevo-tartrate*, *Meso-tartrate*, *αβ-Dibromo-propionate*, *Citrate*, *Orthochlor-benzoate*, *Metanitro-benzoate*, *Phthalate*, *Tetra-chlorophthalate*, *2 Nitrophenyl-4-Tolylamine-4*, *Sulphonate*, and *Scandium Octamethyl tetraminodihydroxyparadixantholbenzenetetracarboxylate*.—Chem. News, Aug. 12, 19, and 26, 1910, pp. 73–75, 85–87, and 97–101.

Scandium—Researches to Establish its Atomic Weight.—In continuation of a previous article (1909), supplementing G. Eberhard's spectroscopic experiments, R. J. Meyer and Herbert Winter have prepared and investigated a number of scandium salts and compounds in the endeavor to establish the atomic weight of this element. The atomic weight determined by them in the course of three researches closely approximated to 45.0, while Nilson, whose number has been adopted in the International Atomic Weight table, and was obtained from the synthesis of the sulphate in four very concordant determinations, found 44.0, or, if O=16, this value becomes 44.1. It is, however, questionable whether Nixon in his purely empirical method actually obtained an exactly neutral sulphate, a condition which, as others have pointed out, is very difficult to attain, and the authors have directed special attention to this point in their study of the atomic weight of scandium, which they have not yet concluded; and, although they can to a certain extent estimate the value of the experiments described in their present paper, they cannot say with certainty that the atomic weight one unit higher—namely, 45.0—is actually correct, and all the less because in some cases they have obtained values which are lower and different from the majority of the results without being able to detect

the reasons for this deviation. It is possible, of course, that scandium prepared from wolframite (the material employed) contains small amounts; but they hope soon to be able to communicate a complete explanation of these irregularities, which will now be all the easier because they have received from Sir William Crooks (see preceding abstract) a specimen of scandium oxide prepared by him from wiikite. By comparing this preparation with their own, obtained from quite different initial material, and by different methods, they will be able to obtain a conclusive result regarding the actual atomic weight of scandium.—Chem. News, Sept. 30 and Oct. 7, 1910, 163–166 and 175–177.

Cerium—New Tetravalent Compounds.—G. A. Barbieri and J. Calzolari find that cerous salts can be oxidized to ceric salts by means of nitric acid only if (1) the cerous salt is soluble in nitric acid; (2) the acid of the cerous salt is not volatile and does not react with nitric acid; (3) the ceric salt is insoluble or only slightly soluble in nitric acid. By this method of oxidation the authors have prepared ceric selenite, $Ce(SeO_3)_2$, and the acid ceric arsenates $Ce(H_2AsO_4)_4$ and $Ce(HAsO_4)_2$. The selenite, like all ordinary ceric salts, is orange-yellow, the compound $Ce(HAsO_4)_2$ is white with a tint of yellow, and $Ce(H_2AsO_4)_4$ is snow-white.—Chem. News, Dec. 9, 1910, 293; from Ber. d. D. Chem. Ges., *43* (1910), No. 14.

Europium—Investigation of Its Identity and Characters.—Following up the investigations initiated some ten or more years ago by Demarçay's observation of a new nitrite in a mixture of rare earths—"more soluble than gadolinium and less soluble than samarium"—which has since been recognized as a new element to which the name "europium" was given, C. James and J. E. Robinson are now engaged in comprehensive experiments to confirm its identity and establish its characters. With this in view they have prepared during the past two years a large quantity of europium oxalate, which was extracted from the oxides of about 200 kilos of yttrium minerals, the oxide derived from about 200 kilos of Brazilian monazite, and about 100 kilos of oxides coming from very large amounts of Carolina monazite. In addition to the europium oxalate, the authors have extracted from about 30 kilos of crude double nitrates of samarium and gadolinium, about 5 kilos of pure samarium oxalate and about 4 kilos of nearly pure gadolinium oxalate. The author hopes to publish some of the results in the near future.—Chem. News, Oct. 6, 1911, 163.

Thallous Hydroxide—Preparation.—According to Fritz Bahr, saturated solutions of thallous hydroxide can be prepared by passing pure oxygen over metallic thorium and water, and shaking thoroughly, and the pure hydroxide can be made to separate out in the solid crystalline state. The dissociation point of thallous hydroxide is 139° C. Thallous hydroxide is sensitive to light, but it has not been determined what chemical reaction

occurs.—Chem. News, Sept. 8, 1911, 120; from Ztschr. f. Anorg. Chem., 71 (1911), No. 1.

Thulium—Recent Research Regarding its Nature and Compounds.—Thulium, which was discovered by Cleve in 1879 (see Proceedings, 1880, 257) while trying to separate the element that gives a rose color to the salts of "old erbium," has now been reinvestigated by C. James, who isolated it from the following minerals: Brazilian monazite; xenotime; ytterspar (Norwegian xenotime, impure); euxenite; fergusonite (Norway, etc.); yttrotitanite; sipylite (columbate from Northern Norway); gadolinite (Norway and Sweden). Also large amounts of oxalates from more soluble double potassium sulphates from Carolina monazite. The best sources were found to be ytterspar, euxenite, and a columbate from an island in the north of Norway. The author gives the details of his investigations and describes the methods by which the various fractions were obtained and purified. The greatest point proved by this work is that the element, giving the characteristic absorption bands of thulium, cannot be separated into simpler substances. After about 15,000 operations, the absorption spectrum underwent no change. Reserving the purest fractions obtained for the determination of the equivalent, which will form the subject of another paper, the author prepared from those not quite so pure many compounds, some of which are described in the present paper, namely: *Thulium Oxide*, Tm_2O_3; *Thulium Bromate*, $Tm_2(BrO_3)_6.18H_2O$; *Thulium Chloride*, $Tm_2Cl_6.14H_2O$; *Thulium Sulphate*, $Tm_2(SO_4)_3.8H_2O$; *Thulium Oxalate*, $Tm_2(C_2O_4)_3.6H_2O$; *Thulium Acetylacetonate*, $(CH_3COCHCOCH)_6Tm_2.2H_2O$; *Thulium Phenoxyacetate*, $(CH_2[C_6H_5O]COO)6Tm_2.6H_2O$; *Thulium Nitrate*, $Tm_2(NO_3)_6.8H_2O$.—Chem. News, Aug. 18, 1911, 73-77.

ZINC.

Zinc Peroxide—Preparation.—E. Ebler and R. L. Krause give the following directions for preparing zinc peroxide, to which they attribute the formula $ZnO_2.\frac{1}{2}H_2O$: Ether is first dried by means of anhydrous sodium sulphate, with which it must remain in contact for fifteen hours with occasional shaking. With 120 Cc. of this ether, 30 Gm. of 30 per cent. hydrogen peroxide (= 9 Gm. H_2O_2) is shaken and the liquid dried in the manner described. This solution contains 2.3 Gm. of H_2O_2. It is quickly filtered from the sodium sulphate, taking means to exclude moisture, and then mixed with a solution of 5 Gm. of zinc ethylate in 300 Cc. of dried ether, in small portions at a time. The zinc ethylate and hydrogen peroxide are in the proportion of 1 molecule of $Zn(C_2H_5)_2$ to 1½ molecules of H_2O_2. The mixing is done in an Erlenmeyer flask, and the contents protected from moisture by means of a $CaCl_2$ trap. There is a strong evolution of gas, and a white precipitate is formed. The flask should be kept cool with ice. The white amorphous precipitate is col-

lected under conditions excluding air and moisture, washed with dried ether thoroughly, and dried *in vacuo* under sulphuric acid. The product is a true zinc peroxide. Dilute acids decompose it with evolution of oxygen. When heated, oxygen is given off, and zinc oxide remains. With cold water it is slowly hydrolysed.—Pharm. Journ. and Pharmacist, October 28, 1911, 561 ; from Zschr. f. Anorg. Chem., June 8, 1911, 150.

Zinc Salts—Modification of Color Reaction with Resorcinol.—Angel del Campo y Cerdán recommends the following modification of the color reaction described in a previous paper (see Proceedings 1910, 265) : In place of a stratum of ether-solution of resorcinol on the surface of an ammoniacal solution of the zinc salt, whereby a characteristic blue ring is developed at the point of contact, an alcoholic, or better, an aqueous solution of resorcinol is added to the ammoniacal zinc solution and the mixture heated to boiling. An almost instantaneous reaction is thus obtained. Neither chromium, iron or aluminium interfere with this reaction, but cobalt, manganese, cadmium and copper do interfere, as do also alkali hydroxides, as well as strong oxidizing or reducing agents.—Pharm. Ztg., lv (1910), No. 82, 827 ; from Anales de la Sociedad Espanola de Fisica y Quimica, Madrid 1910, through Chem. Ztg., 1910, No. 106.

Zinc Oxychlorides—Existence of Two Modifications.—Gustav Vavon's study of the solubility of the oxychlorides of zinc in solutions of the chloride of different concentrations at the ordinary temperature shows that two oxychlorides exist, their formulæ being $ZnCl_2.4ZnO.6H_2O$ and $ZnCl_2.ZnO.1.5H_2O$. The former is a white amorphous substance while the latter forms microscopic crystals. The constitution of these oxychlorides does not vary with the temperature. There is no evidence of the existence of the eight other oxychlorides which have been described.—Chem. News., Aug. 5, 1910, 71 ; from Compt. rend., *150* (1910), No. 22.

Zinc Sulphate—Manganese a Possible Impurity.—Bernard Collitt mentions that while the B. P. mentions a large number of metals which might be present in zinc sulphate and prescribes for their absence, manganese is not mentioned, though from the nature of the material from which zinc sulphate is made this might also be present. He has, indeed, recently examined a sample of zinc sulphate which contained 0.04 per cent. of iron, and 0.08 per cent. manganese. Whether such a sample as this fulfils the requirements of the Pharmacopœia would be decided solely by one's personal idea of what constitutes " only the slightest reaction," and whether that due to the presence of 0.04 per cent. of iron in zinc sulphate falls within or without the limit. The author suggests that in the forthcoming Pharmacopœia the wording of the tests for zinc sulphate and other salts of zinc should read : " It should yield no characteristic reaction with the tests for lead, copper, cadmium, arsenium, aluminium, manganese, sodium, potassium, ammonium, or acetates, and only the slightest reactions with the

tests for iron and chlorides." That zinc sulphate may easily be obtained free from manganese and practically free from iron was proved in the examination of other samples.—Pharm. Journ. and Pharmacist, January 7, 1911, 5.

CHROMIUM.

Chromium, Iron, and Aluminium—Separation by Means of Ammonium Persulphate.—R. C. Cowley observes that the peroxide method for the separation of chromium, iron, and aluminium, which is very expeditious and reliable and has therefore superseded the older method of fusion with an alkali and a nitrate, is restricted in Australia because of certain restrictions on the manufacture of sodium peroxide, due to the danger from fire during transportation. The author has found, however, that ammonium persulphate acts as a very efficient substitute. The precipitated hydroxides are mixed with water in a porcelain capsule, a small quantity of ammonium persulphate is added, and the dish is warmed until the precipitate is dissolved. By this means the chromic hydroxide is converted into a compound of chromic anhydride. On the addition of an alkali the iron is precipitated as ferric hydroxide, and the aluminium and chromium may be detected in the solution in the usual way. Re-solution of the ferric hydroxide in acid and reprecipitation with alkali effects a complete separation of the iron.—Chem. and Drugg., April 29, 1911, 133.

MANGANESE.

Manganese—Detection and Determination of Small Quantities.—G. Bertrand finds that in the detection of manganese in the ash of organic matter three precautions have to be taken: to ensure that the manganese is all converted into a soluble form, to avoid all traces of chlorides, and to eliminate every trace of carbon. The incineration is therefore first performed as completely as possible at a dull red heat. The residue is then treated on the water-bath with excess of hydrochloric acid. When chlorine ceases to be evolved, and the solution is nearly colorless, a little dilute sulphuric acid is added to the mixture, after evaporating to dryness, and again incinerated at a dull red heat. If heated too high, a portion of the manganese may be converted into the insoluble sesquioxide, in which case the treatment with hydrochloric acid and then with sulphuric acid must be repeated, and the heating again performed at a lower temperature, so as just to drive off the last traces of hydrochloric acid. The sulphates thus obtained are dissolved in a little dilute 1 : 3 nitric acid, and the solution is diluted to 5 or 10 Cc. Five drops of silver nitrate reagent, 1 : 10, and at least 0.10 Gm. of powdered potassium persulphate are added, and the mixture is gently warmed. At first a yellowish turbidity generally appears, followed, if any manganese be present, by a pink to violet color. The liquid is then boiled to decompose the excess

of persulphate. The pink tint will then be permanent. If a little persulphate remain in excess, this will fade to a yellowish color, but on heating the pink tint reappears. For determinations, a standard solution of $MnSO_4+4H_2O$, 4.054 Gm. to 1 litre, is prepared equivalent to 1 Mgm. per Cc. Portions of this may be diluted 1 : 10 or 1 : 100, and treated as above with silver nitrate and potassium persulphate. From the color standards thus obtained, the amount of manganese in the substance under examination may be determined by comparison of the tint. The presence of iron and of phosphoric acid in the ash does not materially affect the results.—Pharm. Journ. and Pharmacist, October 21, 1911, 527; from Annales Chim. Analyt., *16* (1911), 285.

Manganese—Preparation of Fluorides and Titration in their Presence.—Erich Müller and Paul Koppe state that the *Red Potassium-Manganese Fluoride*, $2KF.MnF_3.H_2O$, can be prepared by mixing permanganate, manganous sulphate, and hydrofluoric acid in the proportions given by the equation $MnO_4' + 4Mn'' + 8H' = 5Mn''' + 4H_2O$, and adding the corresponding amount of potassium fluoride. The above equation suggests that manganese could be titrated with permanganate in presence of hydrofluoric acid, but the end of the reaction cannot be determined with sufficient accuracy. Volhard's method of determining manganese in presence of fluorides gives incorrect results.—Chem. News, Nov. 18, 1910, 258; from Ztschr. f. Anorg. Chem., *68* (1910), No. 2.

Manganates—Formation.—O. Saekur showed sometime ago that the oxidation of manganese dioxide, or lower oxides of manganese in fused alkali never results in the complete formation of manganate. Later researches prove that the atmospheric oxidation of manganese oxides in excess of fused potassium carbonate results in the formation of a potassium manganic manganate of the formula $Mn_5O_{13}{\cdot}8K_2O$. The formation of this salt probably takes place according to the equations: $5Mn_2O_3 + 10K_2CO_3 + 11O = 2(Mn_5O_{13}{\cdot}5K_2O) + 10CO_2$ and $2(Mn_5O_{13}{\cdot}5K_2O) + 6K_2CO_3 = 2(Mn_5O_{13}{\cdot}8K_2O) + 6CO_2$. When fused sodium carbonate is used a sodium-manganic manganate, $Mn_2O_5{\cdot}4Na_2O$, is formed, sodium manganite, $MnO_2{\cdot}2Na_2O$, being probably an intermediate product. There is thus considerable difference in the behavior of the two alkalies in the production of manganates.—Pharm. Journ. and Pharmacist, May 27, 1911, 711; from Berichte, *44* (1911) 777.

Sodium Manganate—Ready Method of Preparation.—According to V. Auger, sodium manganate can be prepared very easily by decomposing the corresponding permanganate by means of soda. The salt yields hexa-, tetra-, and decahydrates. Its chemical properties are the same as those of potassium manganate, except as regards the decomposition of the salts in presence of their alkaline base in excess; the sodium salt gives the mangani-manganate, $Mn_2O_5.3Na_2O.nH_2O$, and the potassium

salt the salt $Mn_5O_{13}.5K_2O$. The chromate and manganate of sodium are isomorphous.—Chem. News, Sept. 16, 1910, 149; from Compt. rend., *151* (1910), No. 1.

Manganese—Detection in Water.—A. Rodenburg has improved Marshall's method for the detection of manganese in water, by which it can also be applied to water containing iron and organic substances. To 50 Cc. of water he adds 5 Cc. of nitric acid of 50 per cent., boils for some minutes, and then adds a little more silver nitrate than is necessary to precipitate all chlorides. Then 10 Cc. of a 10 per cent. solution of ammonium persulphate are added and heated to boiling point. Already in case of 0.025 milligram of manganese oxide (Mn_3O_4) a light pink color appears. In order to find the average, the solution is diluted to 100 Cc., and compared in a colorimetric tube with the liquid obtained, after identical treatment, from a standard liquid of manganese sulphate of ammonium, which contains 25 milligrams of Mn_3O_4 per liter.—Pharm. Journ. and Pharmacist, Nov. 26, 1910, 637; from Chem. Weekbl., 1910, 879.

MOLYBDENUM.

Molybdenum — Determination in the Calcium Compound.—Dr. W. Trautmann recommends the following method of determining molybdenum in its calcium compound: 0.5 Gm. of the finely-powdered substance, 20 Cc. HCl (1.19) and 1–2 Cc. HNO_3 (1.4) are boiled together a short time, whereby the Mo and Ca are dissolved, while SiO_2 remains undissolved. The mixture is diluted to 150 Cc., added to a mixture of concentrated ammonia and a few cubic centimeters of dark ammonium sulphide, and after warming a few minutes filtered to remove FeS and SiO_2, which are washed on the filter with a very dilute ammoniacal solution containing a few drops of ammonium sulphide. The filtrate and washings, containing all the molybdenum, are now heated and decomposed with HCl, by which the molybdenum is precipitated as trisulphide, and this may then be converted in the usual manner into MoO_3 or MoS_2 and weighed as such.—Pharm. Ztg., lv (1910), No. 100, 1010; from Ztschr. f. Angew. Chem., 1910, No. 42.

TUNGSTEN.

Metatungstic Acid—Classification and Chemical Relations.—According to the studies of Arthur Rosenheim and Franz Kohn, metatungstic acid is an aquo-compound and is thus to be classed not as an isopoly-acid but as a heteropoly-acid. The complex anion probably contains three molecules of water, and its formula is—$H_2[WO(WO_4)_3(H_2O)_3]+Aq$. The pure acid is insoluble in ether. In water it behaves like a normal electrolyte, and reacts like a dibasic acid. In absolute alcoholic solution, on the other hand, it exhibits the properties of a colloidal substance. Esters of the acid cannot be prepared. The results obtained do not agree with the

assumption of Coplaux, that metatungstic acid is $H_{12}W_{24}O_{78}.3H_2O+Aq$.—Chem. News, March 17, 1911, 132; from Ztschr. f. Anorg. Chem., *69* (1911), No. 3.

URANIUM.

Uranium Carbide—Formula and Properties.—According to P. Lebeau, the analysis and the metallographical examination of melts of uranium containing carbon show that the carbide of uranium existing in graphitic melts has the formula C_2Ur. Both in formula and properties this compound resembles the carbides of the rare earths. As regards the complexity of its products of decomposition with water it is most like thorium carbide.—Chem. News, June 16, 1911, 288; from Compt. rend., *152* (1911), No. 14.

Uranous Oxide—Molecular Weight.—Oechsner de Coninck reports that five determinations of the molecular weight of uranous oxide, obtained by reducing uranic hydrate, $UO_3.H_2O$, by pure dry hydrogen at a red-heat, gave as a mean 270.66, the theoretical molecular weight being 270.5. By the reduction of uranyl chloride 270.07 is obtained.—Chem. News, June 30, 1911, 312; from Compt. rend., *152* (1911), No. 18.

Uranium Salts—Reaction.—J. A. Siemssen finds that when a solution of commercial ethylenediamine is added to a solution of any uranium salt, a light yellow precipitate is produced at once, which is soluble in excess. This reaction is quite distinct even in very dilute solutions, and is more delicate than the potassium ferrocyanide test or the hydrogen peroxide reaction of Aloy. The author is investigating the reaction with a view to finding the limit of sensitiveness, and also whether uranium may be precipitated quantitatively by ethylenediamine.—Pharm. Journ. and Pharmacist, June 10, 1911, 773; from Chem. Ztg., *16* (1911), 139.

Uranium Nitrate—Action of Acetic Anhydride.—L. Vanino finds that if solid uranium nitrate is treated with acetic anhydride, no immediate change appears, but after a short time vigorous reaction takes place with evolution of nitrogen peroxide. If only a small quantity of the anhydride is used, the product of the reaction is a yellow liquid; but if about four parts of anhydride are taken to one of the uranium salt, a yellow crystalline powder is deposited, which consists of anhydrous uranyl acetate, $UrO_2(CH_3CO)_2$; this salt has previously only been obtained with two molecules of water. Occasionally reaction does not occur until the mixture is warmed, and this appears to be when the acetic anhydride is free from acetic acid, which is a common impurity in it. Other acids instead of acetic will serve to start the reaction; apparently acetic anhydride can react with nitric acid, but cannot liberate the latter, and an acid is necessary for this purpose. Thorium nitrate reacts fairly vigorously with acetic anhydride containing a few drops of dilute hydrochloric acid, but the ni-

trates of lead and thallium scarcely react at all.—Pharm. Journ. and Pharmacist, Nov. 4, 1911, 593; from Chem. Ztg., Sept. 14, 1911, 1005.

Uranyl Nitrate—Nature of the Ethereal Solution.—It is well known that the crystals of uranyl nitrate containing six mol. of water are soluble in ether. P. Lebeau finds that a slight evolution of heat takes place in the act of solution indicating the formation of a compound of uranyl nitrate with ether. When uranyl nitrate is shaken with ether at 7°, the ethereal layer contains 59 per cent. and the aqueous layer 62.5 per cent. of hydrated uranyl nitrate. Beautiful crystals of an ether-containing uranyl nitrate were obtained by drying the ethereal solution over anhydrous calcium nitrate and cooling in a freezing mixture of solid carbon dioxide and acetone. At least two different compounds exist, the first crystallizes out at—70° and the other is obtained by maintaining the first compound in the melted condition at—10°. Both these compounds lose their ether in dry air at ordinary temperatures, leaving behind a uranyl nitrate containing two molecules of water of crystallisation, which may be otained in light yellow crystals by recrystallization from fuming nitric acid.—Pharm. Journ. and Pharmacist, May 20, 1911, 671, from Compt. rend., *152* (1911), 439.

RADIUM.

Radium—Amount Contained in Some Uranium Ores.—W. Marckwald and Al. S. Russell observe that, as radium is formed from uranium, with uranium X and ionium as intermediate products, and decays with a mean duration of life of less than 3000 years, the proportion of radium to uranium in the uranium ores should be constant. As a matter of fact, Boltwood, and also Strutt, have established the constancy of this ratio for a great number of ores. But Mlle. Gleditsch has recently investigated the ratio of radium to uranium in thorianite, Joachimsthal pitchblende, and autunite, and has obtained values which are in the proportion of 100 : 85 : 58. Since this question is obviously one of great theoretical importance, the authors have now subjected the subject to further study—their investigation extending to 9 different ores of authentic source. None of these ores contains appreciable amounts of sulphur. The measurements of the emanation were sometimes performed in nitric acid, sometimes in hydrochloric acid, and sometimes in concentrated sulphuric acid solution—the observations agreeing within a limit of error of about 2 per cent. The percentage of uranium in the ore was determined in the usual way.

If the ratio of uranium found in—

1. *Joachimsthal pitchblende* is arbitrarily taken to be 100, the authors find that in :
2. *Crystallized pitchblende* (German East Africa) it is 1015.
3. *Thorianite* (Java), 98.1.
4. *Autunite* (Autun), very pure ore, 27.7.

5. *Autunite* (Guarda, Portugal), available in quantities, and in pieces giving different ratios—20.7, 24.9, 38.6, 41.7, and 68.0.

6. *Autunite* (of unknown origin), 60.7.

7. *Rutherfordin* (German East Africa), uranyl carbonate, UO_2CO_3, in two specimens, 86.8 and 83.5.

8. *Carnotite* (Florida), a potassium-uranyl, vanadate and

9. *Carnotite* (Colorado), resemble autunite, and gave values corresponding to 92 and 72 per cent. of the ratio adopted for No. 1.

The authors also studied the question of the period required for the formation of these minerals, basing their investigation on the amount of ionium contained in the ores. Taking the ratio of ionium to uranium to be 100, the values found for the different specimens of autunite lie below 76 and 93; and, as ionium has a mean duration of life of certainly not less than 30,000 years, they assume autunite an age of at least some hundred thousand years.—Chem. News, June 16, 1911, 277–278.

Metallic Radium—Preparation and Properties.—Mdme. P. Curie and A. Debierne, with the object to find out the best method of preparing metallic radium, adopted the method described by M. Gunz for the preparation of metallic barium, which is based upon the preparation of the amalgam and the expulsion of the mercury by distillation under suitable conditions. The boat into which the amalgam was placed for distillation, which was ended when the temperature reached 700° C., contained a shining white metal, melting sharply at 700° C., which the authors regard as being pure radium. It adhered strongly to the iron and could not easily be detached. Metallic radium rapidly alters in the air, becoming black, probably owing to the formation of a nitride. Some particles of the metal were detached by means of a little chisel; some of them, when they fell upon white paper, produced a blackening like a burn. When the detached metal is placed in contact with water it decomposes it energetically, and most of it dissolves, showing that the oxide is soluble. A blackish residue remains, which is almost entirely dissolved on the addition of a very little hydrochloric acid, and this residue must be the nitride resulting from the alteration of the metal in the air. Since dilute acid dissolves nearly the whole of the substance an appreciable amount of mercury cannot be present in the metal. Experiments made to ascertain whether the metal had the radio-activity foretold theoretically, show that the increase of activity agrees well with the law of the formation of the emanation and that the limiting radio-activity would be about normal. Since metallic radium is much more volatile than barium, the authors propose to purify it by sublimation *in vacuo* on a cooled metal plate.—Chem. News, Oct. 7, 1910, 175; from Compt. rend., *151* (1910), 523.

Radium—New Process of Industrial Production.—Ulzer and Sommer have devised a process for the industrial production of radium from pitch-

blend containing but little uranium, which very materially shortens the process, requiring only about 6 weeks for completion, whereas the method heretofore in use required about 18 months. It is stated that the value of the radium that has so far been produced by the new method amounts to about a million of marks.—Pharm. Ztg., lv (1910), No. 100, 1010.

Radium Emanation—Determination of Density to Establish Atomic Weight.—Sir William Ramsay and Robert Whytlow Gray observe that the most conclusive way to establish the atomic weight of a gaseous element is to determine its density. If the element is monatomic both the atomic and molecular weight are obtained by doubling the density. Radium emanation is without doubt one of the inert gases, and it is only necessary to find its density in order to fit it into the Periodic Table. This the authors have done by direct weighings, using a quartz balance (sensitive to half a millionth of a milligram.). The following table gives the results of five determinations:

Vol. of em. weighed at 0° and 760 mm. in thousandths of a cubic mm.	Wt. of emanation in millionth of a mg.	Molecular weight.
72.8	722	222
58.5	564	216
58.5	577	227
67.7	688	218
73.0	706	217
	Mean	220

Thus the emanation is the second member of the series of inert gases, after xenon. Since it is undoubtedly an element its former cumbrous designation might conveniently be dropped, and the authors suggest as a suitable name Niton (shining).—Chem. News., Sept. 23, 1910, 162; from Compt. rend., 151 (1910), No. 2.

Radium Emanation—Action on Thorium Salts.—Two years ago Sir William Ramsay and F. L. Usher (see Proceedings 1910, 263) showed that when a solution of thorium nitrate is allowed to stand for some months, a certain amount of carbon dioxide is set free, and that if the same thorium salt is subjected to the action of radium emanation there is an ever more rapid production of similar amounts of carbon dioxide. In order to explain the result, these chemists suggested that the carbon of the carbon dioxide formed resulted from the transformation of the atoms of the thorium group by the radium emanation. M. Herschfinkel, in order to ascertain the correctness of this assumption, has now repeated Ramsay's experiments, and performed various other experiments with thorium nitrate, which he describes, and obtained results from which he concludes that the carbon dioxide, which is formed in the thorium by the emanation, is *not* due to an atomic transformation of thorium into carbon,

and that, in any case, the production of carbon dioxide observed by Sir William Ramsay is no form of this transformation, since an oxidizing agent also gives carbon dioxide. The impurity in the salt of thorium is very probably a trace of oxalic acid which is employed in preparing it.—Chem. News, Oct. 6, 1911, 163; from Compt. rend., *153* (1911), 255.

In a rejoinder to the above observation of Mr. Hershfinkel, Sir William Ramsay remarks that, while he is glad that other people have studied the action of

Niton (Radium-Emanation) upon solutions of salts, he regrets that Mr. Herschfinkel did not first consult with him. To settle the question in controversy, he carefully purified a specimen of thorium nitrate from all organic impurities. Under conditions described, he invariably obtained from the purified sample some carbon dioxide on exposure to the emanation, whilst the nitrates of bismuth, mercury and silver, exposed in the same way, gave no trace of it.—Chem. News, Oct. 13, 1911, 175; from Compt. rend., *153* (1911), 373.

Radium Emanation—Favorable Influence Upon Plant Growth.—Prof. C. v. Noorden's experiments point out the interesting fact that radium emanation has a decidedly favorable influence on the growth of plants which are freely exposed to it. The author explains this to be partly due to the effect of the emanation on the soil in which the plants grow, but more directly on the influence which it exerts on the vegetable organism itself, probably by promoting the fermentation process of development.—Pharm. Ztg., lvi (1911), No. 38, 381; from Berl. Klin. Wschr., 1911, No. 14.

IRON.

Iron—Organic Compounds with Alkalies.—R. C. Cowley discusses a number of iron compounds with alkalies, with particular reference to their composition. These embrace iron and ammonium citrate, iron and quinine citrate, and iron tartrate, B. P. Among other practical observations, he mentions that to obtain ferric ammonia citrate of green color the proportion of acid should be raised to one molecule and a half of citric acid to one atom of iron. Larger quantities of citric acid than this heighten the green color, but with the increased quantity of ammonium citrate the product becomes correspondingly more hygroscopic and troublesome to scale when neutralized with ammonia. In all the compound the ammonia may be replaced by fixed alkalies, and all the alkalies may be partially replaced by alkaloids without altering the physical properties of the compounds.—Pharm. Journ. and Pharmacist, Febr. 4, 1911, 131–132.

Iron— Comparative Absorbability of Inorganic and so-called "Organic Iron."—Dr. D. G. McLeod Munroe has made a number of clinical experiments with a view of assisting in the settlement of the vexed question

of the relative absorbability of the inorganic iron salts and the so-called organic preparations. The cases selected were four quite typical, although not severe, cases of chlorosis. They were treated respectively with ferroglidine, Blaud's pill, iron and ammonium citrate, and hæmotogen, under conditions suitable for obtaining comparable results. The results obtained in the cases reported, and in others under treatment, so far as they have gone, seem to show that small doses of the organic preparations of iron, as tested against equal doses of the most commonly used and trusted inorganic salts of iron, are absorbed in much greater proportion to the total given per diem. The very large doses of the ordinary salts of iron which are often given are, in the opinion of the author, quite unnecessary, and may even prove injurious. There is no proof that the organism can make any immediate use of the excessive doses. The estimated average total iron in the body is only about 2.5 to 3 grammes, the greater part of which is in the form of hæmoglobin, and the average content of food iron on a mixed diet is not more than one-twelfth to one-sixth of a grain, and yet this quantity suffices to maintain the iron equilibrium. These facts strengthen the argument in favor of administering iron in small enough doses to be efficient without disturbing digestion, and preferably in some form of organic combination.—Pharm. Journ. and Pharmacist., July 29, 1911, 136; from B. M. I., July 15, 1911.

Ferrous Oxide—New Reaction and Quantitative Separation from Alumina.—Prof. Charitschkoff finds that a solution of napthalenic acid in benzin (protroleum ether or ligroin) will extract ferrous oxide quantitively from its neutral or faintly acid aqueous solution; that is to say, so completely that the lower (aqueous) layer will give no reaction with prussiate of potash, while the upper (benzin or ligroin) acquires an intensely brown (chocolate-brown) color in the presence of ferrous oxide. Ferric salts do not give this reaction. This behavior of ferrous salts can be made available for the rapid and exact separation of iron and aluminium. In a solution containing both metals, the iron is first converted into a ferrous salt, and then treated with the benzin-napthalen acid solution as indicated by the above-mentioned reaction.—Pharm. Ztg., lvi (1911), No. 46, 464; from Chem. Ztg., 1911, No. 51.

Iron Preparations—Importance of Controlling Quality.—E. Seel and A. Friederich, as the result of a comprehensive study regarding the nature and function of the iron preparations, arrive at the conclusion that it is not so much a question of superiority of one form of iron, inorganic or organic, over another as a medicament, as it is one of tolerance by the patient. It is the duty of the pharmacist, therefore, to exercise great care in the preparation and preservation of the iron galenicals so that they may be supplied in kind and condition expected by the prescriber. As is well known, many of these preparations undergo considerable change on keep-

ing—such as Blaud's pills, for example—and these changes are not always evident without resort to tedious tests, which invariably become necessary if the preparation is purchased. To exercise proper control, it is therefore recommended that pharmacists dispense only preparations of their own manufacture, the quality of which can be ascertained by the simplest tests.—Pharm. Ztg., lvi (1911), No. 19, 194; from Ber. d. D. pharm. Ges., 1911, No. 2.

NICKEL.

Nickel Superoxide—Preparation and Properties.—C. Tubandt and W. Riedel find that when oxidizing agents act on nickelous compounds in absence of free alkali, black precipitates of nickel superoxide are obtained. The action of ozone on cooled solutions of bicarbonate containing nickel salts gives a dark red solution, which appears to be an unstable colloidal solution of nickel superoxide. Weak acids, such as acetic acid, tartaric acid, citric acid, also give colloidal solutions of nickel superoxide. Benedict believed that he had obtained nickelic sulphate by heating nickel superoxide with a concentrated solution of potassium sulphydrate, but the authors have shown that all the reactions of his supposed nickelic salt are actually those of Caro's acid, and the brick-red powder he obtained is a salt of manganese, present as an impurity. In presence of sulphuric acid nickel superoxide oxidizes the lower oxides of manganese to permanganic acid. Attempts to get compounds of trivalent nickel by the nickel anodic oxidation of simple and complex nickel salts, give indications of positive results only in the case of a concentrated sodium bicarbonate solution. The authors have not succeeded in isolating the compound.—Chem. News, Nov. 17, 1911, 245; from Ztschr. f. Anorg. Chem., *72* (1911), No. 2.

TIN.

Tin Group of Metals—Method of Separation.—R. M. Caven suggests a method for the separation of the metals of the tin group, which is a modification of that proposed by Walker. The mixed sulphides are reprecipitated from their solution in alkali, collected, washed, and boiled with concentrated hydrochloric acid according to a well-known method of separation, and the remaining arsenious sulphide, filtered off from the diluted solution, may then be identified in the usual manner by making use of its solubility in ammonium carbonate solution. To the filtrate, free from hydrogen sulphide and containing antimonious and stannic chlorides, potassium hydroxide is added until the hydroxides precipitated are just redissolved in excess of alkali. Bromine water is then added until the solution remains yellow; thus antimonite, which would be hydrolized in presence of ammonium chloride, is oxidized to antimonate. The addition of solid ammonium chloride first causes the evolution of nitrogen, be-

cause of the hypobromite present; then stannic hydroxide separates, and, after boiling, is collected. The filtrate contains only the antimony, which is precipitated as antimonic sulphide on acidifying and passing hydrogen sulphide. The advantage of this scheme of analysis, which has been found rapid and satisfactory, is that it employs Walker's excellent method of separating tin from antimony without postponing the identification of arsenic, which may result in small quantities of this element finally present as arsenate being missed by the experimenter.—Pharm. Journ. and Pharmacist, July 30, 1910, 132; from Proc. Chem. Soc., *26* (1910), 176.

Tin—Distillation in Vacuo.—Although tin has a low melting point (230° C.), its boiling point is very high, and hence it is difficult to distill it. Erich Tiede and Franz Fischer have constructed an apparatus in which it is possible to obtain high temperatures in a vacuum, and have thus succeeded in distilling tin. They have investigated the properties and reactions of the products obtained by the distillation of various commercial varieties of tin and have obtained the pure metal, free from sulphur.—Chem. News, Sept. 29, 1911, 161; from Ber. d. D. Chem. Ges., *43* (1911), No. 11.

Stannous Chloride—New Compounds with Ammonia.—Ath. I. Sofianopoulos describes two new compounds of stannous chloride and ammonia. He says ammonia is absorbed by stannous chloride at temperatures below 0°, a compound, $SnCl_2.2NH_3$, being formed, which is stable at the ordinary temperature. It is a yellow amorphous powder with an ammoniacal smell. When exposed to the action of air it blackens, and is decomposed by the water in the air, $SrCl_2.2NH_3 + H_2O = SnO + 2NH_4Cl$. At a temperature of about 300° C., stannous chloride absorbs ammonia, forming a new compound, $3SnCl_2.2NH_3$. It is a red-brown double refracting mass, which appears to be the most stable of the compounds of stannous chloride and ammonia. It is decomposed by water as follows: $3SnCl_2.2NH_3 + H_2O = 2SnCl_2 + SnO + 2NH_4Cl$. With hydrogen it yields metallic tin.—Chem. News, June 2, 1911, 263; from Compt. rend., *152* (1911), No. 13.

GERMANIUM.

Germanium—Extracted from Blende.—G. Urbain, M. Blondel, and M. Obiedoff extract germanium from blende by the following process: The powdered blende is treated with its own weight of concentrated sulphuric acid and heated. The solid mass is taken up with water, and the insoluble residue is again treated similarly. Sodium sulphide is added to the aqueous solution, and the zinc is eliminated from the sulphides thus obtained by dissolving in sulphuric acid containing not less than 15 per cent. of acid. The sulphides containing germanium are oxidized together with nitric acid or by heating in an oxidizing atmosphere, the solution is evaporated to dryness, and sulphuric acid is again added. The solution is precipitated with sulphuretted hydrogen, and the sulphide precipitate is

treated as before. If the germanium is not yet sufficiently concentrated the liquid is precipitated with ammonia and the precipitates are disolved in sulphuric acid. The sulphides finally precipitated in hydrochloric acid solution are treated with ammonia in excess; the sulphides of germanium and arsenic containing traces of molybdenum instantly dissolve, and the solution is then cautiously precipitated with an acid which is more and more diluted as the process is continued. It is thus quite possible to precipitate all the arsenic and molybdenum, leaving the germanium in the solution, from which a perfectly white sulphide of germanium can be obtained.—Chem. News, Sept. 30, 1910, 166; from Compt. rend., *150* (1910), No. 26.

LEAD.

Lead Peroxide — Volumetric Estimation.—Dr. J. F. Sacher finds the method of Lux for the volumetric datermination of lead peroxide to be both simple and expeditious. It is carried out, for example, by heating 2.07 Gm. of minium with 20–30 Cc. of nitric acid, sp. gr. 1.2, and adding after the complete decomposition of the minium 50 Cc. of $\frac{N}{5}$ oxalic acid, heating to boiling, which rapidly effects the solution of the PbO_2, and then titrating back the excess of oxalic acid. But Dr. Sacher has observed that the PbO_2 is partly dissolved by the nitric acid, this leading to errors in the analysis. If, however, the oxalic acid is added before the nitric acid, accurate analytical results are uniformly obtained.—Pharm. Ztg., lvi (1911), No. 55, 556; from Chemiker-Ztg., 1911, No. 80.

TITANIUM.

Titanium Chlorides and Formates — Preparation and Properties.—Arthur Stähler and Fritz Bachran find that titanium trichloride, $TiCl_3$ can be obtained by passing a current of hydrogen and titanium tetrachloride vapor through a silundum tube, heated to about 1100° C. When the trichloride is heated to 660–700° C. in a current of hydrogen in absence of air it is converted into the dichloride and tetrachloride, $2TiCl_3 \rightleftharpoons TiCl_2 + TiCl_4$. The dichloride can be decomposed into the tetrachloride and titanium by heating to 1100° C. The authors have prepared double formates of titanium, and ammonium and potassium respectively, by adding solutions of the formate of the metal to a solution of $TiCl_3$ in absence of air. The double formates give olive-green solutions in water, and are hydrolytically decomposed at 50° C., giving dark blue titanium hydroxide and formic acid. The dry salts are comparatively stable in air, but their solutions are readily decomposed. When some drops of an aqueous solution of titanium trichloride are added to a very dilute solution of gold chloride, an intense violet coloration is produced. Colloidal gold is formed, and absorbs titanic acid. If the violet solution is boiled a voluminous dark blue precipitate separates. It contains both gold and titanium.

The dry precipitate is insoluble in ammonia.—Chem. News, Dec. 8, 1911, 282; from Ber. d. D. Chem. Ges., *43* (1911), No. 14.

THORIUM.

Thorium—Biological Action.—Experiments made by W. von Bolton with reference to the influence of metallic thorium and thorium oxide on vegetable and animal life show that thorium, especially in the metallic state, acts at first as a stimulant to bacteria, but finally kills them, whilst its action on animals is wholly favorable owing to its bactericidal action. The evidence as stated in support of the first conclusion is none too convincing; but no doubt a fuller memoir may be expected elucidating the points which seem to invite criticism. The evidence for the second conclusion, based on experiments with that lowly vertebrate, *Amphioxus lanceolatus*, appears overwhelming. In this series of experiments there was a control without thorium, and in the others the amount of thorium was varied. Not only did the fish in the control tank die much sooner than the others, but the longevity of the others was in direct proportion to the concentration of thorium in the sand of the tank.—Pharm. Journ. and Pharmacist, Dec. 30, 1911, 881; from Zschr. f. Electro-chem., through Chem. Trade Journ., Nov. 25, 1911, 524.

Thorium—Detection and Determination with Iodic Acid.—According to R. J. Meyer, iodic acid is an absolutely reliable reagent for determining small amounts of thorium. The solution must contain nitric acid, and a large excess of the precipitating reagent must be employed. Two solutions are required, a concentrated solution containing 15 Gms. KIO_3, 50 Cc. conc. HNO_3, and 100 Cc. water, and a dilute solution, containing 4 Gms. KIO_3, 100 Cc. dil. HNO_3, and 400 Cc. water. Five Cc. of solution I are added to 2 Cc. of the solution to be tested, and then 10 Cc. of solution II. On boiling the thorium iodate precipitated remains undissolved, while the iodates of the cerite and yttrium earths go into solution. Zirconium gives the same reaction as thorium, but zirconium iodate is soluble in oxalic acid, while thorium iodate is not. Hence if zirconium is present the precipitate must be washed with oxalic acid. The iodic acid can be used to separate thorium quantitatively from scandium.—Chem. News, Sept. 8, 1911, 120; from Ztschr. f. Anorg. Chem., *71* (1911), No. 1.

Thorium—Formation of Double Sulphates.—M. Barre finds that when the solubility of thorium sulphate in solutions of potassium sulphate of different concentrations is determined, it is found that three double sulphates are formed, viz., $Th(SO_4)_2.K_2SO_4.4H_2O$, $Th(SO_4)_2.2K_2SO_4.2H_2O$, $Th(SO_4)_2.3.5K_2SO_4$. With sodium sulphate one compound is obtained, corresponding to the formula $Th(SO_4)_2.Na_2SO_4.6H_2O$. Ammonium sulphate yields three salts: $Th(SO_4)_2.(NH_4)_2SO_4.4H_2O$, $Th(SO_4)_2.2(NH_4)_2SO_4.2H_2O$, and $Th(SO_4)_2.3(NH_4)_2SO_4.3H_2O$.—Chem. News, Aug. 12, 1910, 84; from Compt. rend., *150* (1910), No. 24.

Thorium Salts—Theory of the Manufacture.—J. Koppel and M. Holtkamp submit the following theory of the manufacture of thorium salts: The raw material used in the manufacture of thorium is monazite, a phosphate of the rare earths, containing about 60 per cent. of rare earths and 5 per cent. of ThO_2. It is opened up by heating with concentrated sulphuric acid, and the mixture of the sulphates of the rare earths thus obtained is dissolved in a large quantity of water. Oxalic acid was formerly used to separate the thorium, but it is now found better to neutralize the filtrate from the sulphates, when thorium phosphate is precipitated first while the other earths remain in solution. The thorium phosphate thus obtained contains cerium and didymium; to purify it, it is washed, dissolved in hydrochloric acid, and the thorium is precipitated with oxalic acid. The raw thorium oxalate is then decomposed with soda solution. The hydroxide thus obtained is converted into sulphate, and again into hydroxide in order to remove the last traces of impurity. Finally, the hydroxide is dissolved in nitric acid, and the solution is evaporated, and thus the pure nitrate is obtained. The authors have subjected this "sulphate purification process" to a thorough investigation, in the course of which they determined the solubility of the hydrates of thorium sulphate in sulphuric, hydrochloric and nitric acids, and have found that the presence of phosphoric acid hinders the separation of sulphate, and when large quantities are present no sulphate precipitate is formed. When the hydroxide which is to be converted into sulphate is dissolved, only hydrochloric acid is used technically, and from the results of the solubility experiments the authors conclude that the use of nitric acid would not increase the yield of sulphate. There would be no harm in having excess of acid, although this is most carfully avoided in the technical process. With a great excess of sulphuric acid the solubility is decidedly decreased, and thus the yield is increased, but then a strongly acid mother-liquor is obtained, and this is difficult to work up. If, however, phosphoric acid is present in the thorium its solvent action is diminished by the excess of sulphuric acid, which is a great advantage. In order to prevent the formation of the gelatinous 4-hydrate, which is difficult to filter, and to obtain the 8 hydrate, the temperature during precipitation must be kept below 42°. In presence of large excess of acid the formation of the 4-hydrate occurs at a lower temperature than in neutral solution.—Chem. News, Oct. 14, 1910, 197; from Ztschr. f. Anorg. Chem., *67* (1910), No. 2.

Thorium Chloride—Compound with Ammonia.—Ed. Chauvenet states that three series of compounds of anhydrous thorium chloride and ammonia are formed. The first are obtained by treating thorium chloride with liquid ammonia, and then subjecting the product to progressively increasing temperatures, the second by allowing gaseous ammonia to act on thorium chloride, while some of the compounds of the second series unite

with liquid ammonia to give rise to a third series of compounds which are isomeric with the preceding. The first series is composed of additional products, $ThCl_4 + nNH_3$, which are similar to the ammoniacal aluminium chlorides. The second group consists of more stable compounds which are not decomposed by water nor by the action of a vacuum. They may be represented by the formula: $Th(NH_2[NH_4]Cl)_3.NH_3Cl$. The third series consists of addition products: $Th(NH_3Cl)_4 + nNH_3$. Above 120° only one ammoniacal derivative, $ThCl_4.4NH_3$, exists.—Chem. News, Oct. 7, 1916, 185; from Compt. rend., *151* (1910), No. 5.

Thorium Sulphate—Decomposition by Water.—According to M. Barre the decomposition of thorium sulphate by water begins at 55° C. A hydrate, $Th(SO_4)_2ThO_2.6H_2O$, is formed, but it is very unstable and is rapidly transformed into a basic salt containing four molecules of water.—Chem. News, Sept. 16, 1910, 149; from Compt. rend., *151* (1910), No. 1.

Thorium Sulphate—Specific Resistance and Freezing-Point in Aqueous Solution.—M. Barre states that the specific resistance and the freezing-point of thorium sulphate in aqueous solution agree perfectly with the laws of Bonty and Raoult. The measurement of the conductivity and of the freezing-point of solutions containing 1 per cent. of potassium sulphate indicate the formation of a double salt, and thus the results of determinations of the solubility are confirmed.—Chem. News, Sept. 23, 1910, 162; from Compt. Rend., *151* (1910), No. 2.

New Thorium Salts—Preparation and Properties.—Georges Karl has obtained and describes several new thorium salts:

Thorium Picrate, $Th(C_6H_2N_3O_7)_4 + 10H_2O$, is obtained by the addition of ammonium picrate to a hot aqueous thorium nitrate solution. It has a low melting-point (52–53°), and explodes when heated in a naked flame. The anhydrous picrate is a glassy yellow substance which does not become liquid at 100°. By the addition of the calculated amount of ammonium hippurate to an aqueous solution of thorium nitrate the white crystalline

Thorium Hippurate, $(C_6H_5.CO.NH.CH_4.COO)_4Th$, is precipitated. The author has prepared the following basic

Thorium Chloracetates:—The monochloracetate, $(ClCH_2.COO)_2Th(OH)_2 + H_2O$; the dichloracetate, $(Cl_2CH.COO)_2Th(OH)_2$; and the trichloracetate, $(Cl_3C.COO)_2Th(OH)_2$.—Chem. News, Nov. 11, 1910, 245; from Ber. d. D. Chem. Ges., *43* (1910), No. 11.

Mesothorium.—A New Radio-active Element.—In 1907 O. Hahn indirectly proved that thorium, on undergoing radio-active atomic disintegration, was converted into a metabolon, of which the half-constant was about five and a half years. He called it *mesothorium*. In 1908 he showed mesothorium is not directly converted into radio-thorium, but that a short-

lived (half duration of life=6.2 hours) intermediate product, *Mesothorium* II, results. Recently Hahn succeeded in concentrating the substance to such an extent that its action considerably exceeded that of an equal weight of pure radium salt. W. Marckwald now contributes some further information respecting this new substance. He had undertaken the investigation of a "radium preparation," to determine its percentage of radium, which, although it consisted essentially of barium chloride, should have contained, judging from its γ-radiation, more than 1 per cent. of radium chloride: yet, when its power of emanation was investigated it was found that the radium emanation evolved corresponded to only about 0.2 per cent. of radium. Further investigation showed that the greater part of the γ-radiation (about 80 per cent.) was due to mesothorium II, which was completely precipitated with the ferric hydroxide when the aqueous solution was rendered ammoniacal after the addition of a trace of ferric chloride. This precipitate emitted a strong γ-radiation, but lost it almost completely within about six hours, while the barium chloride obtained by evaporating the solution, which had lost almost all its power of emitting γ-rays, regained the greater part of its power of radiation in a day. As a matter of fact, after the decay of the mesothorium II, there remained a residue which emitted α-rays, and which gave thorium emanations. The author concludes that evidently mesothorium is completely analogous to radium from a chemical point of view. This complete similarity of the two radio-active elements is very interesting. For up to the present no method has been found of separating by chemical reactions the four elements—thorium, radiothorium, ionium and uranium X. Now it seems as if another group of radio-active elements of similar properties exists; to this group belong radium and mesothorium, and possibly other metabolons.

The study of the chemical properties of mesothorium reveals a method of preparing it from the residue of the manufacture of thorium. It is an exact reproduction of that by which radium is obtained from uranium ore residues.—Chem. News, Jan. 13, 1911, 13.

COPPER.

Copper—A New and Delicate Test.—While many excellent and delicate tests have been prepared for the detection and determination of copper, R. Uhlenhuth finds the reaction of a solution of "diamido anthraquinonesulphonic acid" in dilute alkalies to form the most delicate test of all heretofore proposed. This reagent gives a strong blue color with a mere trace of copper and is due to the formation of a complex salt. 0.5 Gm. of the acid is dissolved in 500 Cc. of water with the addition of 40 Cc. of caustic soda of a strength of 40° Beaumé, and a little of this liquid is added to the liquid suspected to contain copper; if the latter is present the blue color is formed. This color is easily seen if the copper is present to the extent of 1.9 in 1,000,000, and the limit of the test is reached at about ten times

this dilution; a blank test with the reagent should be made for comparison. This test should prove very useful in food analysis and in pharmaceutical and physiological testing.—Pharm. Journ. and Pharmacist, Oct. 1, 1910, 417; from Chem. Ztg., Aug. 20, 1910, 887.

Copper Oxide—Catalytic Action.—According to J. Strachan, an interesting lecture experiment illustrating the catalytic action of copper oxide may be performed as follows: A bundle of asbestos fibers is attached to the end of a thin iron wire. The asbestos is then dipped into a strong solution of copper sulphate, and ignited in the Bunsen flame. This operation is repeated, and the asbestos is thus covered with finely divided black oxide of copper. When this is heated and immersed in the gases issuing from a Bunsen burner, the asbestos becomes red-hot and continues to glow. By careful regulation of the air supply the gases may be ignited, but this appears to depend upon the composition of the gas. When the hot asbestos is introduced into the neck of a small conical flask in which hydrogen is being generated from zinc and sulphuric acid, the mixture of air and hydrogen is rapidly ignited. The finely divided copper oxide on the asbestos will also inflame an explosive mixture of hydrogen and oxygen, but as in the previous experiments the asbestos must first be heated in a Bunsen flame, quickly withdrawn from the latter and introduced into the vessel containing the mixed gases before it becomes too cold. These lecture experiments may be varied by holding the hot cupricised asbestos above the mouth of a small flask, in which methyl alcohol is boiling gently. When held at a short distance above the mouth of the flask the hot asbestos rapidly becomes bright red-hot, and the aldehyde smell is at once recognized. By lowering the glowing asbestos into the mouth of the flask the glow ceases, and the copper oxide is reduced to bright metallic copper. By using a bunch of asbestos fibers about 5 Cms. long in this experiment. bright metallic copper, red cuprous oxide, and black cupric oxide gradually passing into each other may be produced from the same length of asbestos.—Chem. News, May 26, 1911, 241.

Copper—Questionable Reliance on the Flame Test by Burning Fats.—It has been shown previously that when organic bodies containing nitrogen are heated with copper oxide, a green color is produced in the flame, due probably to the formation of copper cyanide. In the case of oxyquinoline, it was found that the same color was produced in the flame when copper was entirely absent and a porcelain burner was used. It is now observed by Vaupel, that many fats show a similar behavior; lard, milk-fat, coconut oil, and bacon, with and without the rind, all gave a copper color to the Bunsen flame when placed in it; the color is only produced at first, and apparently moisture must be present in the fat. This behavior shows the necessity for great caution in regarding the flame-test as evidence of the presence of copper.—Pharm. Journ. and Pharmacist, Sept. 24, 1910, 391; from Chem. Ztg., 1910, 685.

Referring to the preceding observation by Vaupel that on igniting fats containing moisture in the Bunsen flame, a green color similar to that given by copper compounds is seen in the flame, even when copper is entirely absent, J. F. Sacher says that the green color so obtained is different from that given by copper, and that it is due to the carbon monoxide formed from particles of fat heated to burning-point but cut off from the air by a burning outer layer and the carbon dioxide and water formed from it; the carbon monoxide burns with a blue flame, and this blends with the yellow color caused by the sodium chloride present in many animal fats, forming a green-colored flame, which, however, unlike the copper flame, is more distinct if the fat is held just outside the Bunsen flame instead of actually in it. It is also pointed out that animal fats frequently contain boric acid added as a preservative, which would give a green color to the flame.—Ibid; from Chem. Ztg., Aug. 4, 1910, 823.

Copper—Colorimetric Determination in Preserved Foods.—H. Serger finds that the electrolytic method of determining copper in preserved foods recommended by K. Lakus gives excellent results, but cannot be carried out rapidly, and when a number of determinations are to be made the amount of platinum apparatus available in most laboratories is insufficient. Further, any gravimetric method begins to fail when the amount of copper is very small. The following colorimetric method gives excellent results:—The solid material to be examined is drained free from liquid on a sieve, 100 Gm. then weighed out, cut up if necessary, and spread out on a filter paper in a flat porcelain dish. It is next thoroughly dried at 110° and ignited in a silica crucible, the ash dissolved in 10 Cc. of hydrochloric acid, and the solution rinsed into a beaker and diluted with 40 Cc. of water. Excess of ammonia solution is then added and the liquid filtered into a 100 Cc. Nessler glass, washing the precipitate and filter until a quantity of 100.Cc. is obtained. Five Cc. of ammonia solution and 80 Cc. of water are put into another Nessler glass, and enough of a 0.5 per cent. solution of copper sulphate to produce, after dilution to 100 Cc., a liquid of equal depth of color to the first. From the number of Cc. of solution required the amount of copper is found (1 Cc. = 0.00126 Cu.). If a solution containing 3.95 per cent. of copper sulphate is employed, instead of 0.5 per cent., each decimal used represents 1 part of copper per million parts of the substance under examination. A number of tests with peas and spinach treated with known proportions of copper sulphate gave very good results, and tests on samples of these vegetables containing unknown amounts of copper gave results very close to those obtained by the electrolytic method.—Pharm. Journ. and Pharmacist, Dec. 9, 1911, 779; from Chem. Ztg.,, Aug. 26, 1911, 935.

Copper—Possibly a Constant Constituent of Vegetable Tissues.—In a paper on the detection and estimation of very small quantities of copper

in vegetables, B. Guérithault shows that in the various substances he has examined, the copper has been found to vary between 0.0171 and 0.046 per 1000 of the dry material. The results warrant him in thinking that copper is a constant and true physiological element in vegetable tissues. Among the substances examined are verbena, juniper (twigs and leaves), gentian (root), wormwood, cress, radishes, lentils, oats, wheat, maize, haricots, peas.—Pharm. Journ. and Pharmacist, Dec. 9, 1911, 779; from Bull. Sci. Pharmacol., Nov. 1911, 633.

MERCURY.

Mercurial Compounds—Volatility in Aqueous Vapor.—T. Lecco has found in the course of experiments on the toxicological detection of volatile poisons that mercury and its salts in the presence of organic matter are distinctly volatile in aqueous vapor, so that the distillate will contain quite notable quantities, in suspension, in the metallic state. Sometimes the metal may be so finely divided that it is barely visible; occasionally enough will be present to form an immediate precipitate. When mixtures of organic matter with mercurial salts, such as calomel or corrosive sublimate, are distilled, these compounds are reduced to the metallic state, and then quite a quantity of the metal will be carried over on distillation. In the course of toxicological examination, therefore, mercurials should be treated as volatile poisons.—Apoth. Ztg., xxv (1910), 225.

Mercury Compounds—Decomposition in Contact with Organic Matter.—W. Brunetti has obtained some experimental results in the course of an investigation of the influence of organic matter on mercury compounds, which are of interest particularly in toxicological chemistry. Metallic mercury, mercuric sulphide, and mercuric cyanide do not change when kept in contact with organic matter (meat juice), and they do not volatilize in steam. Yellow mercuric iodide is also unchanged, but is slightly volatile in steam. Red mercuric iodide is not reduced, but distils in a current of steam to the extent of 18.22 per cent., and is found in the distillate as the yellow modification. When examined microscopically, a drop of the distillate shows, at a magnification of 150 diameters, warty branching crystals. The branches, when examined at a greater magnification (300 diameters), are seen to be made up of small plates laid on each other like tiles. The yellow iodide changes gradually into solid red prisms of the other modification. Thus for the purpose of forensic analysis, mercuric iodide in this form may be placed in the group of volatile poisons. The mercury in mercurial ointment volatilizes in steam in quantities varying with the fineness of subdivision. Of the other mercury compounds examined by the author, the following were reduced in contact with organic matter: Mercury peptonate, albuminate and nucleinate, mercurous chloride, nitrate, acetate, and oxide, mercuric chloride and white precipitate. When the filter is pressed between finger and thumb,

the reduced mercury forms globules, which can easily be observed with the unaided eye.—Pharm. Journ. and Pharmacist, June 17, 1911, 809; from Ztschr. f. Unters. d. Nahr. u. Genussm., 1911, 92.

Organic Amalgams—Production by Electrolysis.—H. N. McCoy and W. C. Moore state that by the electrolysis of a saturated solution of tetramethylammonium chloride in absolute alcohol with a mercury cathode and a silver anode, at —10° C., with a current of 18 volts, tetramethylammonium amalgam was obtained as a silvery white substance with a crystalline structure. When the temperature rises above 0° C., the crystalline structure becomes less marked, but the amalgam is quite stable. At higher temperatures, decomposition occurs, with liberation of trimethylamine. It reacts strongly with water, giving off hydrogen, and yielding dark gray solutions of colloidal mercury. Strong solutions of the alkali chlorides do not cause separation of colloidal mercury, but simply form amalgams of their respective metals. Copper sulphate solution forms copper amalgam, with separation of a little colloidal mercury. Mercuric chloride is reduced to calomel with separation of colloidal mercury. A similar amalgam of monomethylammoniun was obtained with monomethylammonium chloride solution by the same method; but no amalgam could be obtained with a number of other similar salts.—Pharm. Journ. and Pharmacist, May 6, 1911, 587; from Journ. Amer. Chem. Soc., 33 (1911), 273.

Mercury—Some Reducing Actions.—The action of mercury on solutions of a number of substances has been examined by D. Borar, with the following results:—(1) Potassium permanganate is reduced to potassium hydroxide and manganese dioxide, the mercury being oxidized to mercuric oxide. (2) Potassium dichromate in neutral solution is not reduced. In the presence of hydrochloric acid, however, chromium chloride and mercurous chloride are formed. (3) Ferric salts in the presence of hydrochloric acid are reduced to the ferrous state. The experiments showed that mercury may be used as a reducing agent for ferric compounds in the estimation of iron. (4) Potassium persulphate is reduced to potassium sulphate, the mercury being converted into a basic sulphate. (5) Copper sulphate in the presence of hydrochloric acid is reduced to cuprous chloride. (6) Nitrobenzene in the presence of hydrochloric acid is reduced to aniline to a small extent. (7) Solutions of potassium nitrate, potassium chlorate, and sodium peroxide are not acted on by mercury to any appreciable extent.—Pharm. Journ. and Pharmacist, July 22, 1911, 101; from Proc. Chem. Soc., *27*, No. 386, 128.

Mercury—Volumetric Determination in Galenical Preparations.—Discussing several methods for the determination of the metal in mercurous and mercuric compounds, Charles E. Smith directs particular attention to the volumetric method which consists in the titration of mer-

curic compound, in nitric acid solution, with sulphocyanate in exactly the same way as the titration of silver, which he considers to be perhaps the best volumetric method available for some purposes. This method was first made serviceable for accurate work by R. Cohn (1901) and simplified by Rupp and Kraus (1902), and is used in the German Pharmacopœia for the assay of several galenical preparations. For convenience the author gives the assay methods for mercury preparation prescribed in the G. P.—Amer. Journ. Pharm., July, 1911, 311–315.

Mercury—Colorimetric Estimation in Very Dilute Solutions.—H. R. Proctor and R. A. Seymour-Jones recommend a colorimetric method for the estimation of mercury in very dilute solution, which is based upon the observation that the metal is not precipitable as sulphide with H_2S in the presence of formic, citric or other organic acid, the HgS being retained in colloidal solution. The intensity of the color produced is in direct proportion to the amount of metal present, which may thus be estimated by comparison with a standardized solution of the same by one of the known colorimetric methods.—Pharm. Ztg., lvi (1911), No. 65, 653; from Journ. Soc. Chem. Indus., through Chem. Ztg., 1911, No. 90.

Mercuric Salts—Avoidance of Error in Toxicological Examinations.—L. Garnier directs attention to a possible source of error in toxicological estimations of mercurial compounds. It is shown experimentally that during the evaporation of solutions of corrosive sublimate a considerable loss may occur, owing to the volatility of the mercuric salt, and therefore great care should be taken in conducting the process. He suggests that, after dissolving the mercuric sulphide (obtained in the usual course) in a little aqua-regia, to determine the mercury by the electrolytic method; or, following the method of Rose, to treat the HgS precipitate with hydrochloric acid, phosphoric acid, and phosphorous acid, whereby the HgS is converted into calomel, which is collected on a filter, washed, dried, and weighed.—Pharm. Ztg., lvi (1911), No. 29, 293; from Journ. de Pharm. et Chim., 1911, No. 1.

Mercuric Oxychlorides—Conditions of their Formation.—According to M. Driot, the mercuric oxychloride formed in the dry way has the formula $HgCl_2.2HgO$. When a boiling solution of sublimate is saturated with mercuric oxide from solutions containing small amounts of sublimate (0.5—4 per cent.) fine needles of formula $HgCl_2.3HgO$ are obtained. 4—8 per cent. solutions give $HgCl_2.3HgO$, while 13 per cent. solutions give $2HgCl_2.HgO$. A 30 per cent. solution at 100°, after treatment for five or six days with finely powdered oxide, gives the compound $HgCl_2.HgO$. —Chem. News, June 16, 1911, 288; from Compt. rend., *152* (1911) No. 14.

Calomel—Chemical Changes in the Organism.—Egidio Pollaci's studies lead him to attribute the therapeutic action of calomel to its reaction with

sulphocyanides, which are distributed throughout the entire organism, according to the following equation :— $2HgCl+2KCNS=Hg(CNS)_2+Hg+2KCl$. The pharmacological action is due to the liberated mercury. The simultaneous administration of halloid salts (Cl. I. Br.) should be avoided because they exert solvent action upon the coagula produced by $Hg(CNS)_2$ with the albumen in the organism.—Pharm. Ztg., lv (1910), No. 66, 667 ; from Bull. Chim. Farm., *49*, 273–285.

Calomel—Not Incompatible with Sodium Chloride.—Epominonda Frederice observes that potassium iodide and calomel are known to react to produce mercuric iodide and mercury, but the analogous reaction with sodium chloride does not take place. The author finds that sodium chloride even in considerable excess does not affect mercurous chloride. A concentrated solution of mercuric chloride, containing 100 Gms. in 160 of water at 15°, may be made if the corrosive sublimate is first mixed with sodium chloride. A small amount of insoluble matter is left, which cannot be dissolved either by addition of excess of sodium chloride or by heat. This residue was found to be calomel. It thus appears that mercurous chloride is not changed into corrosive sodium by the action of sodium chloride, and when mixtures of calomel and common salt give the reactions for mercuric chloride the corrosive sublimate must be originally present as impurity in the calomel.—Pharm. Journ. and Pharm., April 15, 1911, 499 : from Boll. Chim. Farm., 1910, 169, through Ztschr. d. Algem. Oesterr. Apoth. Ver., 1911, 56.

Mercurous Nitrate—Action of Ammonia.—H. Saba and K. Choudhuri find that the black substance produced by the action of ammonia on mercurous nitrate consists of a mixture of metallic mercury and a white compound having the empirical formula $N_2Hg_2H_4O_5$, which is copiously soluble in strong ammonia. The formula assigned by Barfoed to the white substance, $2(NH_2HgNO_3)HgO$, is not confirmed by the author's experiments. —Pharm. Ztg., lvi (1911), No. 65, 653 ; from Ztschr. f. Anorg. Chem., 1911, 309.

ARSENIC.

Arsenic—Occurrence in Marine Algæ.—Arsenic has been found by E. Tassilly and J. Leroide in the following algæ in the proportions stated :— *Chondrus crispus*, 0.070 ; *Fucus vesiculosus*, 0.010 ; *Mousse de Corse*, 0.025 ; *Laminaria digitata*, 0.050 ; *L. saccharina*, 0.010 ; L. *flexicaulis*, 0.010, the figures being milligrams per 100 Gms. The algæ in question were first washed, before analysis, until the washing gave no reaction with silver nitrate. They contained, at the time of examination, 20 to 30 per cent. of water. The authors support Gautier's statement that the arsenic pre-exists in the algæ.—Pharm. Journ. and Pharmacist, Dec. 24, 1910, 761 ; from Bull. de Sci. Pharmacol., Oct. 1910, 580.

Arsenic Amalgam—Preparation and Properties.—E. Dumesnil prepares arsenic amalgam as follows:—Dissolve 10 Gms. of pure arsenious anhydride in 100 Gms. of concentrated hydrochloric acid; then dissolve 40.65 Gms. of mercuric chloride in 700 to 800 Gms. of 20 per cent. hydrochloric acid; mix the two solutions and filter; add 60 Gms. of pure sodium hypophosphite, shake occasionally, then allow the mixture to remain at rest for several hours, and finally boil for a few moments. A black precipitate, granular and homogeneous, is formed, which under the microscope is seen to be formed of mammilated crystals of a blackish-brown tint, brownish-yellow in the thin layers. After cooling, the precipitate is collected, washed with boiling water, and dried *in vacuo*. The proportions of the reacting bodies as above are calculated for the production of the amalgam, As_2Hg_3. When this amalgam is heated in a test-tube, it volatilizes without melting, and gives a sublimate formed of arsenious anhydride, in very small quantity, and metallic arsenic and mercury. The amalgam contains 20 per cent. of arsenic, and 80 per cent. of mercury.—Pharm. Journ. and Pharmacist, June 3, 1911, 741; from L'Union Pharm., May, 1911, 215.

Arsenic—Quantitative Volatilization.—P. Jannasch and T. Seidel find that arsenic can be quantitatively volatilized from solutions containing hydrazine sulphate if some potassium bromide or hydrobromic acid is added, the distillation taking an hour at the most. The arsenic can be determined in the distillate either as trisulphide, or as magnesium pyroarsenate, or titrimetrically. The results obtained by this method of separating arsenic from antimony, copper, mercury, and other metals are very accurate, the apparatus required is simple, and the process is rapid.—Chem. News, July 1, 1910, 12; from Ber. d. D. Chem. Ges., xliii (1910), No. 7.

Arsenic—Possible Fallacy of Fleitmann's Test.—In a recent case of dietetic arsenical poisoning it was found expedient to examine the urine of the affected person for traces of arsenic some six weeks after the poison had been taken, the medical man who undertook the examination employing the well-known Fleitmann test, and finding by this test that arsenic was still being excreted. Walter J. Dilling, doubting the probability of arsenic being excreted in the urine six weeks after the ingestion of a single subtoxic dose, performed control tests by means of Reinsch's and Marsh's methods. These proved completely negative, while Fleitmann's reaction appeared to indicate the presence of arsenic in this particular sample of urine, and also in a sample of normal urine. This reaction depends on the reduction of silver nitrate by means of arsenuretted hydrogen, generated from the material under examination, to metallic silver, causing a purplish-black spot to appear on paper impregnated with the reagent. On looking into the matter to discover the cause of this reaction from urine free from arsenic, the author found that uric acid was the principal substance re-

sponsible for the result, but that this reduction will only occur if steam issuing from the mouth of the tube containing the reacting material comes in direct contact with the moistened silver nitrate paper placed over it. If the reacting material is tested only until a current of hydrogen bubbles is evolved *and no longer*, and the silver nitrate paper then placed over the mouth of the tube, the danger of reduction by steam is avoided. The author finds that other members of the xanthine series, besides uric acid, such as caffeine, theobromine, xanthine, and guanin, will also cause the purplish-black spot resembling the arsenical reaction under the conditions described.—Pharm. Journ. and Pharmacist, Dec. 16, 1911, 811.

Arsenic—Preparation of Colloidal Solutions.—Anger says that on bringing a hydrochloric acid solution of arsenic trioxide into contact with an aqueous solution of hypophosphorous acid, there is obtained brownish-black, amorphous arsenic, insoluble in alkalies in the cold. If the reaction is carried out in the presence of highly concentrated alcohol, there is obtained below 0° an ochre-yellow product which becomes reddish-brown on drying. On dissolving this product in diluted sodium hydroxide solution there results immediately a colloidal solution of brown color. The solution exhibits all the properties of colloids. It has not been possible thus far, however, to obtain the solution free from phosphorus, which may, perhaps, be necessary to the formation of this variety of arsenic.—Pharm. Zentralh., li (1910), No. 51, 1205; from Journ. de Pharm et Chim.

Solid Hydrides of Arsenic and of Antimony—Determination.—Hans Reckleben and Johannes Scheiber find that, like other arsenic compounds,

Arsenic Hydride can be oxidized quantitatively to arsenic acid by ammoniacal silver nitrate solution. It exists in one form only, and has the composition represented by the formula H_2As_2 or HAs. The solid hydride is formed when a dark discharge passes through arsenuretted hydrogen, when the arsenides of the alkali metals are decomposed by water, and when arseniuretted hydrogen is incompletely oxidized by oxygen or air in the cold. The solid hydride is not formed when arsenic is sublimed in a current of hydrogen, nor when arsenic is sublimed by cooling a flame of arseniuretted hydrogen. Regarding

Antimony Hydride, the authors say that oxidation by means of iodine solution can be used for the quantitative analysis of antimony precipitates. Under the influence of the dark discharge antimoniuretted hydrogen gives pure antimony, and it is also obtained when the compounds of antimony and the alkali metals are decomposed by water vapor at the ordinary temperature. Explosive antimony contains no solid antimony hydride, but traces of hydrochloric acid are present in it.—Chem. News, July 21, 1911, 36: from Ztschr. f. Anorg. Chem., *70* (1911), No. 3.

Arsenic Tri-iodide—Properties and Unsatisfactory Commercial Quality.

—Dr. E. Richter has found in the course of a comprehensive investigation that the commercial arsenic tri-iodide is frequently quite impure and unfit for medicinal use, but that it may be satisfactorily purified by recrystallization from carbon disulphide. The purified product when sufficiently dried is almost odorless, forming scarlet to garnet-red hexagonal crystals, which dissolve in 50 parts of water, without leaving more than a trifling residue, forming a solution with an acid reaction. On addition of hydrogen sulphide this aqueous solution gives a yellow precipitate, which is insoluble in hydrochloric acid, but soluble in alkalies, ammonium carbonate, and in alkaline sulphides. Silver nitrate produces, after addition of a few drops of nitric acid, a yellow flocculent precipitate, which is insoluble in ammonia and in nitric acid. Arsenic tri-iodide is dissociated when dissolved in alcohol, forming arsenic trioxide, ethyl iodide, and hydriodic acid. The same dissociation results when aqueous solutions of 1.10 are attempted; but solution of 1 :50 or 100 may be preserved unchanged for a long time, and such are not affected by the addition of from 5 to 10 per cent. of alcohol.—Apoth. Ztg., xxvi (1911), Nos. 69 and 70, 728 and 742.

Arsenic Pentoxide—Formation of Hydrates.—D. Balareff has studied the conditions under which hydrates of arsenic pentoxide are formed. On evaporating a solution of arsenic acid both at 180° and 40°, $H_5As_3O_{10}$ separates out. From solutions of different concentrations at the ordinary temperature on cooling, $H_3AsO_4.\frac{1}{2}H_2O$ or a mixture of $H_3AsO_4.\frac{1}{2}H_2O$ and $H_5As_3O_{10}$ separates out. When $H_3AsO_4.\frac{1}{2}H_2O$ is dried $H_5As_3O_{10}$ is formed, and when it is heated it decomposes into $H_5As_3O_{10}$ and an aqueous solution.—Chem. News, Sept. 8, 1911, 120; from Ztschr. f. Anorg. Chem., *71* (1911), No. 1.

Arsenic—Elimination from the Organism.—Ch. Bongrand makes some interesting observations concerning the elimination of arsenic from the organism following its therapeutic use. This elimination occurs in two ways: either very slowly, in which event it begins very shortly after the administration of the remedy; or suddenly, after very variable intervals, in which event large quantities of arsenic are eliminated at a time. These observations are significant and of great toxicological importance, because there is only a short step between the retention of arsenic in quantities by the organism and the manifestation of its toxic properties.—Pharm. Ztg., lvi (1911), No. 29, 293; from Bull. de Scienc. Pharmacol., 1911, No. 3.

ANTIMONY.

Antimony—Separation from Tin by Distillation.—According to W. Plato, antimony and tin can be quantitatively separated by distillation, and the same method can be applied to the quantitative separation of antimony, tin and arsenic from one another and from the heavy metals, especially copper and lead. The method depends upon the behavior of anti-

mony and tin when they are distilled in a current of hydrochloric acid from a sulphuric acid solution to which phosphoric acid has been added. The tin combines with the phosphoric acid to form tin phosphoric acid, provided that the temperature is not allowed to exceed a definite limit (155–165°), and the antimony can be distilled off. Then the temperature is raised, hydrobromic acid is added, and the tin is distilled off.—Chem. News, Nov. 11, 1910, 245; from Ber. d. D. Chem. Ges., *43* (1910), No. 11.

Antimony—Accurate Method of Determination.—In the course of analytical work connected with an article presented for the doctoral degree, E. G. Beckett made a comprehensive study of the method for the determination of antimony, which led him to the following conclusions:

1. The most accurate method of determining antimony is by precipitation as trisulphide, and weighing it as such. The method of Vortman and Metzl is preferable to that of Henz from its greater convenience and accuracy.

2. Antimony trisulphide precipitated from hydrochloric acid solutions always contains chlorine, which cannot be removed by washing. The amount of this chlorine is greatly reduced by heating the precipitate to 300° C. in a stream of CO_2, after which the Sb_2S_3 generally contains from 0.5 to 0.3 per cent. Cl.

3. The volumetric determination of antimony with iodine gives very concordant results, but these are only correct when the older atomic weight of antimony (Sb=122) is used. When the atomic weight is taken as being 120.2 the results are about 1 per cent. too low.

4. The determination of antimony as tetroxide is unreliable when a blow-pipe is used for the ignition. The method may give good results if the oxide is heated in a furnace giving a uniform temperature of between 800° and 900° C., but means have to be adopted to prevent the absorption of hygroscopic moisture during the process of weighing.

5. The determination of antimony as pentoxide is not reliable.

Chem. News, Aug. 26, 1910, 101–104.

Antimony—Detection and Estimation of Small Quantities.—T. Schidrowitz and H. A. Goldsborough describe a colorimetric method for the detection and estimation of antimony, present in quantities so small as $\frac{1}{50}$ to $\frac{1}{100}$ grain to the pound of certain foodstuffs, such as preserved meats, etc. The method is based on the formation of a colloidal solution. The authors have found that 0.01 Gm. of gum acacia in 10 Cc. total volume is sufficient to maintain 2 Mgms. of antimony in colloidal solution. The antimony employed in the experiments was in the form of tartar emetic. The coloration (sulphide) obtained is characteristic and extremely delicate. In this way it is possible to determine 1 part in 2,000,000. The coloration obtained by passing hydrogen sulphide into hot solutions is

deeper than that obtained with cold solutions, the hot process being preferred when very small quantities are in question. For quantities of 0.02 Mgm., however, the cold process is sufficiently delicate. The control solutions were made up as follows:—Known quantities of antimony (tartar emetic) were made up to a total volume of 10 Cc. with distilled water, after adding 0.5 Cc. of strong hydrochloric acid and 0.1 Cc. of a 10 per cent. gum acacia solution. The absence of other metals which might form colloidal solutions, *e. g.*, arsenic or mercury, is assumed. Foreign organic matter must also be reckoned with. For foodstuffs, the method of Reinsch is brought into requisition. It is well known that, in the presence of permanganate, dilute alkaline solutions will dissolve antimony which has been deposited on copper, and that in this way the separation from arsenic or organic matter may be effected. The copper with the antimony deposit is warmed to about 70° C. for a few minutes with 5 Cc. of a 5 per cent. potassium hydroxide solution, 10 Cc. of distilled water, and an excess of permanganate. As a rule 1 Cc. of a permanganate solution, of which 1 Cc. is equal to 0.01 Fe, is sufficient. The solution is then poured off the copper, the latter washed with a little distilled water and the solution then boiled for a few minutes, and subsequently filtered from the precipitated MnO_2. The excess of permanganate is destroyed by adding a 1 per cent. solution of tartaric acid to the boiling liquid until the latter is colorless. The solution is then made up to a known volume, an aliquot part taken, and made up to 10 Cc., after adding the requisite amount of gum solution and hydrochloric acid, after which the liquid is saturated with hydrogen sulphide as above. While the method falls short of the truth, the authors regard it is probably as accurate as any at present in use.—Pharm. Journ. and Pharmacist, May 13, 1911, 621; from Analyst, March, 1911, 101.

BISMUTH.

Basic Bismuth Compounds — Effect of Age on Fixation of Sulphide.—Dr. Hulse having drawn attention to the fact that the characteristic brown or black color of the stools was absent in the treatment of infantile complaints with the so-called creams, milks or magmas of bismuth, it was suggested by Prof. Sollmann to J. L. Stingel that he determine by chemical experiment whether the various basic bismuth salts really differ in their behavior towards sulphides. On the basis of experiments now recorded, Mr. Stingel concludes that "the suspensions of the various bismuth salts are practically, equally effective in binding H_2S, but in old magma this property is impaired.—Amer. Journ. Pharm., Sept., 1911, 412.

Alkaline Bismuthides — Preparation of Definite Compounds.—A. G. Vournasos finds that potassium and sodium combine with bismuth in boiling paraffin, yielding definite products, Na_3Bi and K_3Bi, independently of the proportions in which the constituents are present. Na_3Bi forms little

crystalline lamellæ of a blackish gray color. Both bismuthides are easily oxidized in the air, and give a black powder consisting of suboxide of bismuth and alkali. The products readily catch fire, leaving a residue formed of a brick-red alkaline bismuthate. The bismuthides slowly decompose water at the ordinary temperature, yielding caustic alkali and a black powder consisting of bismuth oxide and bismuth. They reduce soluble cupric salts, giving a characteristic precipitate of copper. They absorb hydrogen at 350°, probably with formation of solid BiH_3.—Chem. News, May 20, 1911, 252; from Compt. rend., *152* (1911), No. 11.

Bismuth Subchloride, B. P. Codex—Comparison of Constitution with that of Commercial Samples.—The directions of the B. P. Codex for preparing subchloride of bismuth are as follows: (1) "By adding a solution of bismuth nitrate to a solution of sodium chloride." (2) "By adding a solution of bismuth nitrate to very dilute hydrochloric acid." (3) "By pouring a solution of bismuth oxide in hydrochloric acid into water." These three methods depend on the insolubility of the oxychloride in very dilute nitric or hydrochloric acids. In a paper relating to the constitution of commercial bismuth subnitrate (see Proceedings, 1910, 279), J. Bristowe P. Harrison showed that the constitution of bismuth subchloride prepared by heating bismuth subnitrate with solution of sodium chloride is represented as $Bi_{12}O_{13}Cl_{10}$, and not by the simpler formula BiOCl, as has previously been supposed. The fact that a commercial sample of bismuth subchloride having been analyzed and found to contain 11.78 per cent. chloride—which is slightly in excess of that required by the constitution $Bi_{12}O_{13}Cl_{10}$—led the author to prepare samples according to the methods given in the B. P. Codex in order to determine their constitution. Three preparations, each weighing about 10 grams, were obtained, and the chlorine determined gravimetrically as follows: (1) 13.6 per cent.; (2) 13.77 per cent.; (3) 13.85 per cent. The compound $Bi_{12}O_{13}Cl_{10}$ contains theoretically 11.59 per cent. chlorine, while 13.66 per cent. chlorine should be found in BiOCl. These results show that the three methods of the B. P. Codex give rise to one and the same oxychloride, the constitution of which seems to depend on the fact that the parent bismuth compound must be previously brought into solution. It is obvious that the commercial sample already referred to cannot have been manufactured by any of these methods, and it became a point of interest to know how far these methods of preparation were being generally followed by bismuth manufacturers. With this object in view three samples of different manufacturers were analyzed and found to contain respectively 14.85, 12.23, and 12.11 per cent. of chlorine, corresponding respectively to the formulas BiOCl, $Bi_{16}O_{17}Cl_{14}$, and $Bi_{12}O_{13}Cl_{10}$, in the same order. The author assumes that the process of preparation employed can be ascribed with some degree of certainty to one of two general methods: "If BiOCl represents the constitution, then the product has in all probability been obtained by one of

the modifications given in the British Pharmaceutical Codex, in which the parent bismuth compound is previously brought into solution. On the other hand, if the oxychloride has been prepared by boiling bismuth subnitrate with solution of sodium chloride, its constitution will be in general $Bi_{12}O_{13}Cl_{10}$, although it will always be a fraction of that of the subnitrate used."—Trans. Brit. Pharm. Conf. (Year-book of Pharmacy), 1911, 441–443.

VANADIUM.

Metallic Vanadium—Preparation.—Wilhelm Prandtl and Benno Bleyer find that when a mixture of 100 parts of fused powdered V_2O_5, 49.5 parts of aluminium powder, and 20 parts of calcium fluoride is heated in a magnesia crucible, or better still, if the first two constituents are heated in a hollowed-out mass of calcium fluoride, a vanadium regulus is obtained, the weight of which amounts to 70 to 80 per cent. of calculated weight. In spite of every precaution the vanadium metal thus prepared never contains more than about 95 per cent. of vanadium, the residue consisting of oxygen.—Chem. News, Dec. 30, 1910, 329; from Ber. d. D. Chem. Ges., *43* (1910), No. 14.

Vanadium—Preparation and Characters of some Halogen Salts.—Otto Ruff and Herbert Lickfett have prepared and describe several bromides and fluorides of vanadium, as follows:

Vanadium Bromides.—When bromine or a mixture of bromine and sulphur bromide acts at a red heat on a mixture of vanadium pentoxide and sulphur, a product is obtained, which, when heated to 240° *in vacuo*, gives pure vanadium oxydibromide $VOBr_2$, as a residue, sulphur bromide and bromine distilling off. If the the temperature of the residue is raised to 360° the vanadium oxydibromide sublimes and partially decomposes, leaving as residue a violet product, vanadium oxybromide, VOBr, which has not been prepared before. When heated *in vacuo* to 480° vanadium tribromide sublimes, and the trioxide remains behind.

Vanadium Fluorides.—When fluorine acts on vanadium or the anhydrous halogen salts it is difficult to separate the mixture of fluorides formed, but compounds of tri, tetra, and pentavalent vanadium can readily be obtained by the action of anhydrous hydrofluoric acid on the vanadium haloids. Thus from pure vanadium trichloride the trifluoride, VF_3, is obtained, from tetrachloride VF_4, from the oxydibromide VOF_2, and from the oxytrichloride VOF_3. When vanadium tetrafluoride is heated above 300° gas is evolved, the tetrafluoride decomposing quantitatively into the trifluoride, and the gaseous pentafluoride VF_5. Thus vanadium tetrafluoride can be prepared most easily by heating the tetrafluoride to redness in a current of nitrogen. Chem. News, Nov. 10, 1911, 233; from Ber. d. D. Chem. Ger., *43* (1911), No. 13.

TANTALUM.

Tantalum — Determination and Correction of Atomic Weight.—While carrying out an investigation on columbium, Clarence W. Balke found it possible to make a satisfactory determination of the atomic weight of that element through the conversion of its pentachloride into the corresponding oxide. The author has now carried out a similar investigation with tantalum chloride, using, in general, methods very similar to those employed in the former work. The details of these investigations are described, the results being summarized as follows: "In eight experiments 91.51605 Gms. of tantalum chloride gave 56.49791 Gms. of tantalum oxide, corresponding in round numbers to 181.5 as the atomic weight of tantalum, a number one-half a unit higher than that now given in the International Table." Further work upon the value of this constant is in progress.—Chem. News, Dec. 16, 1910, 295–297.

Tantalum—Halide Salts.—Walter K. Van Haagen observes that of all the possible halides of tantalum, the chloride alone has received more than passing attention. A bromide has been recorded, but the iodide is absent from our literature. He has now succeeded in preparing both the pentabromide and the pentaiodide under conditions explained and describes them as follows:

Tantalum Pentabromide ($TaBr_5$) consists of yellow elongated lamellæ, curving or clinging to the tube (in which they are found) in beautiful arborescent forms resembling frost flowers. They fuse easily to a transparent ruby colored liquid. Their color is suggestive of that of potassium bichromate. They may be sublimed without melting. The vapor of the bromide is yellow. The bromide fumes strongly in the air; it melts at about 240° C., and begins to boil at 320°. It may be sublimed unchanged in an atmosphere of hydrogen, but this is possible only at a temperature just sufficient for the sublimation, for at more elevated temperatures a partial reduction to the metallic state occurs. It dissolves rapidly in absolute methyl or ethyl alcohol, usually generating heat sufficient to cause the alcohol to boil, forming an amber-yellow liquid which soon becomes colorless. The reactions point to the formation of tantalic esters.

Tantalum Pentaiodide (TaI_5) sublimes (under the condition of its preparation) in dark nearly black lamellæ, bearing a remote resemblance to iodine crystals. It fuses to a dark brown liquid. Its vapor is like that of bromine. It may be distilled in a current of carbon dioxide without the separation of iodine. It resembles the bromide in its deportment toward moist air and water (? Rep.) Neither an oxybromide nor an oxyiodide of tantalum was observed by the author.—Chem. News, July 8, 1910, 13; from Journ. Amer. Chem. Soc., xxxii, No. 6.

SILVER.

Silver—Detection and Determination of Very Small Amounts.—G. Stafford Whitby observes that all solutions of silver salts when heated with caustic soda and certain organic substances give a yellow or brown coloration even if only one part of silver is present in 25,000,000 parts. The organic substances are dextrin, gum arabic, cellulose, starch, and cane-sugar. Some drops of a fairly concentrated sugar solution are added to 50 Cc. of the solution, the beaker is heated for two minutes on a water-bath, six drops of a normal solution of caustic soda are added, and it is again heated for 20 to 30 seconds. The color of the solution is then compared with that of a solution containing a known amount of silver. Ammonia must not be present, but the other metals investigated did not affect the coloration, which is due to the presence of colloidal silver. Probably the caustic soda converts the silver into the hydroxide, which then reacts directly with the organic substances, a hydrogen ion of the organic molecule is split off and forms water with the hydroxyl ion of silver hydroxide, while the silver, robbed of its ionic charge, goes into colloidal solution.—Chem. News, Aug. 26, 1910, 108; from Ztschr. f. Anorg. Chem., *47* (1910), No. 1.

Silver Nitrate—Removal of Stains Without Cyanide.—To remove silver nitrate stains from hands and fabric without the dangerous use of potassium cyanide, Prentiss J. Minton recommends to first apply tincture of iodine. After several minutes this will dry; then apply a saturated solulution of sodium hypophosphite. This decolorizes the tincture of iodine and the silver nitrate stains will disappear as if by magic.—Bull. Pharm., August, 1910, 343.

Silver Sulphate — Solubility in Alkaline Sulphates.—According to M. Barre, the solubility of silver sulphate in potassium and ammonium sulphates increases regularly with the concentration of the alkaline salt; the curves obtained at different temperatures, taking as abscissæ the alkaline sulphate and as ordinate the silver sulphate in the solution, are straight lines for potassium sulphate and very nearly straight lines for ammonium sulphate. With sodium sulphate very different results are obtained. Below 33° C., i. e., as long as the sodium sulphate is hydrated, the solubility of silver sulphate increases with the concentration of the sodium sulphate. Above 33° the curves show a maximum but no angular point, and mixed crystals are formed. In solutions containing less than 40 per cent. of sodium sulphate the solubility of the mixed crystals increases as the temperature rises, while with a higher concentration it decreases. When the concentration is 40 per cent. the solubility is independent of the temperature. This peculiarity is due to the difference of sign of the heat of solution of silver sulphate and sodium sulphate.—Chem. News, Aug. 5, 1910, 70; from Compt. rend., *150* (1910), No. 21.

GOLD.

Gold—Advantageous Composition of the Aqua Regia for its Solution.—The studies of E. Priwoznik demonstrate that the proportions of acids and water recommended by Prat, viz., 200 Cc. conc. HCl (sp. gr. 1.194), 45 Cc. conc. HNO_3 (sp. gr. 1.4), and 245 Cc. water, are the most advantageous and suitable for dissolving gold. An excess of either of the acids is not only valueless for effecting the solution of the gold, but actually harmful. He finds that 1 Kgm. of gold requires 4296 Gm. (=3849 Cc.) of aqua-regia of the composition above mentioned.—Pharm. Ztg., lv (1910), No. 100, 1010; from Oesterr. Ztschr. f. Berg.-u. Hüttenw., 1910, through Chem. Ztg., 1910, No. 136.

Gold—Determination by Means of Ether.—Gold chloride, unlike other metallic chlorides, is soluble in ether. F. Mylius, taking advantage of this, found that the amount of gold in a coin can be estimated by shaking the hydrochloric acid solution with ether and distilling off the ether, and that the limit of error does not exceed 0.01 per cent.—Chem. News, July 21, 1911, 35; from Ztschr. f. Anorg. Chem., *70* (1911), No. 3.

PALLADIUM.

Palladium—Absorption of Acetylene.—According to C. Pall and Christian Hohenegger, colloidal palladium has a greater power of absorption for acetylene than for hydrogen, and when the ratio of the volume of acetylene absorbed to one volume of palladium was determined it was found that it varied between wide limits, and evidently the phenomenon is one of absorption only, no chemical compound being formed. Finely divided palladium also absorbs acetylene.—Chem. News, Dec. 30, 1910, 329; from Ber. d. D. Chem. Ges., *43* (1910), No. 14.

IRIDIUM.

Iridium—Atomic Weight.—D. Hovermann reports that the values deduced for the atomic weight of iridium, by four different methods, from the analysis of the salt K_2IrCl_6, were 192.942, 192.881, 192.956, and 193.116, while the analysis of the salt $(NH_4)_2IrCl_6$ gave the value 193.403. —Pharm. Journ. and Pharmacist, Nov. 11, 1911, 625; from Sitzungsber. Physical-medizin. Soc., through "Nature," Oct. 19, 1911, 528.

OSMIUM.

Osmic Acid—Preparation and Properties.—G. Mossler contributes the following interesting observations concerning osmic acid. This is more correctly called "osmic anhydride," and is prepared by dissolving osmium in aqua regia and evaporating, or by heating finely divided osmium in a stream of oxygen or air, or moist chlorine, at 400° C. When pure it forms white prismatic crystals, but as usually met with it has a greenish or greenish-gray color, due to slight decomposition. The crystals melt below

100°, and it is volatilized on further heating; the anhydride is very soluble in water but is slow in dissolving, and the water solution is stable if light and air are excluded. It is also soluble in alcohol or ether, but these solutions become dark colored on keeping owing to reduction. When working with osmic acid the eyes should be well protected, as both crystals and solution give off vapors which are very corrosive to the mucous membrane. Osmic acid may be identified by the following tests, applied to a 2 per cent. solution in water: (1) On adding 2 or 3 Cc. of sulphurous acid to 1 or 2 Cc. of the solution the latter gives a yellow color at once, a brown color on standing, and finally a violet; (2) the solution acidified with hydrochloric acid gives with H_2S-water a brown precipitate, which quickly becomes black, and is insoluble in ammonium hydroxide or sulphide; (3) the solution liberates iodine from solution of an iodide, and slowly decolorizes an indigo solution; (4) on gently warming the solution with an equal volume of solution of hydrogen peroxide and adding caustic potash the liquid becomes colored red to red-violet. As evidence of purity, osmic acid should be entirely soluble in water to a neutral solution; if 10 Cc. of a 2 per cent. solution is heated in a water-bath with an equal volume of alcohol until the black precipitate which forms has settled and most of the alcohol evaporated, then diluted with water to twice its volume and filtered, the filtrate should leave no residue when evaporated to dryness.—Pharm. Journ. and Pharmacist, July 23, 1910, 97; from Ztschr. d. allgem. oesterr. Apoth. Verein., 1910, 98.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(*Including Volatile Oils and Derivatives.*)

Mineral Oils—Elimination of Sulphur Content.—D. Lohmann states that for the accurate determination of sulphur in petroleum and other oils of mineral origin, by far the best method is combustion in a Mahler bomb. Other methods in use involve evaporating the oil in a current of air and burning it, or soaking it up with a wick and burning it; but as the sulphur compounds often do not evaporate *pari passu* with the other constituents of the oil, an error may arise from this cause, and the amount of sulphur in the air, especially the air of a refinery, may necessitate much washing of the air, and the carrying-out of a blank experiment. If an oil contains about 0.15 per cent. of sulphur, 1.0 to 1.5 Gm. is sufficient to take for combustion with oxygen in a Mahler bomb, this quantity giving about 0.01 Gm. of barium sulphate; if less sulphur than that is present, the same quantity is taken for a combustion, but more than one combustion is made, and the products of all are added together for precipitation by barium

chloride. Careful working under strictly defined uniform conditions is requisite for obtaining reliable results.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 625; from Chem, Ztg., Oct. 7, 1911, 1119.

Kerosene—its use in pharmacy and as a therapeutic agent—is a subject discussed by William R. White in a paper which appears in "Proceedings," 1910, 1129–1131.

Petroleum Oils—Refractive Indices.—G. A. LeRoy finds that the determination of the refractive index is useful in differentiating the petroleum oils, in conjunction with determinations of specific gravity, flashing-point, etc. The following figures were obtained from American, Russian and Roumanian oil respectively, using the Abbe-Zeiss refractometer and temperature 15°: Crude petroleum, 1.4540; 1.4595; 1.4639. Oil of specific gravity 0.720, 1.3995; 1.4105; 1.4055. Lamp oil, ordinary, 1.4550; ——; 1.4562. Lamp oil, white, 1.4430; 1.4530; 1.4560.—Pharm. Journ. and Pharmacist, March 18, 1911, 369; from Ann. de Chim. Analyt., Jan. 15, 1911, 12.

Naphtha and Derivatives — Determination and Origin.— N. Chercheffsky has prepared a table (which must be consulted in the original paper) giving the following data for naphthas of various origins for the distillate obtained by fractioning the product under examination: Density, boiling-point, index of refraction, index of solubility, critical temperature of solution, temperature at which turbidity appears, iodine index. By comparing the results obtained with a given specimen with the tabulated results not only can the origin of the naphtha or its derivative be determined, but also the approximate composition of commercial samples can be ascertained.—Chem. News, Aug. 5, 1910, 71; from Compt. rend., *150* (1910), No. 21.

Tribrom-β-naphthol, mentioned in last year's report as possessing marked disinfective properties (see Proceedings 1910, 287), is now prepared on a commercial scale and exploited in substance as well as in form of solution, dusting powder and ointment. It is produced by the action of 3 mol. bromine on 1 mol. β-naphthol, and is supplied in form of a brown-red to light red crystalline mass, odorless and tasteless, but has no constant melting point, and therefore regarded a more or less indefinite mixture of several isomeric tribrom-β-naphthols. It is readily soluble in alcohol, acetone, methylalcohol and benzol, comparatively readily soluble in oils and saponifiable fats, but with difficulty in benzin and paraffin, and completely insoluble in water. By the aid of caustic alkalies it is readily dissolved in water, forming, however, unstable solutions, but with alkali carbonates it becomes possible to prepare a 10 per cent. aqueous solution, which possesses stability and is miscible with water in all proportions.—Pharm. Ztg., lvi (1911), No. 25, 254.

Benzoyl-Betanaphthol (Benzonaphthol).—Preparation and Properties.

—G. Mossler communicates the following interesting information concerning the preparations, characters and tests of identity of benzoyl-beta-naphthol (naphthol-benzoate or benzonaphthol). It is prepared by heating β-naphthol with rather more than the calculated quantity of benzoyl chloride, first at 122° and then at 175°; the product is washed first with dilute alkali and afterwards with water, and recrystallized from alcohol. It is also made by interaction of naphthol-sodium and benzoyl chloride. Benzonaphthol occurs as white odorless and tasteless needles or crystalline powder, having no effect on moistened litmus paper, almost insoluble in water or dilute alkali, soluble with difficulty in boiling ether, easily soluble in alcohol and chloroform; melting point 111°; it leaves no ash on ignition. As a test for identification 0.1 Gm. is dissolved in 1 Cc. of strong sulphuric acid, the mixture warmed until it begins to turn yellow, then diluted with water to about 20 Cc. and excess of ammonia added; a strong green fluorescence is produced. Another test is to heat 0.2 Gm. with 2 or 3 Cc. of alcoholic alkali for some time, then add 5 to 10 Cc. of water; the characteristic odor of ethyl benzoate is observed, and on acidifying the cold solution benzoic acid and β-naphthol are precipitated; the addition of a few drops of mercuric nitrate solution to this precipitate gives a red color, due to the β-naphthol. The requirements as to purity include the absence of chloride and sulphate, of free benzoic acid and β-naphthol and of α-naphthol.—Pharm. Journ. and Pharmacist, July 30, 1910, 132; from Ztschr. d. allgem. Oesterr. Apoth. Verein., 1910, 190.

VOLATILE OILS AND DERIVATION.

Volatile Oils—Pharmacopœial Description.—In a paper on the proposed essential-oil monographs of the B. P., H. John Henderson remarks that there is no doubt that the system of publishing suggested official monographs for criticism before including them in the Pharmacopœia is a good one, yet it is a little doubtful whether the procedure adopted is the best that could be devised. There have been many individual views published on the essential oils during the past ten years, the whole of which material is available for the use of the committee, and which, properly digested, would have formed valuable material for criticism. He considers it doubtful whether the introduction of more stringent tests will be productive of anything other than a stimulus to further activity in a certain kind of research of an undesirable character. Indeed, the thought obtrudes itself as to whether the essential-oil question is not in danger of being lost in a wordy wilderness. Thus, the author adduces evidence to show that the refractive indices should find no place in the official monograph; for it is not pretended that these figures will tend to raise the quality, or indeed to indicate it, and it therefore remains for the presence of a standard for a refractive index for essential oils to be justified. In support of his contention the author submits the results obtained in the examination of a

number of oils—anthemidis, anethis, carus, copaiba, lavandulæ, pimento, rosmarini—which have brought out some interesting facts.—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1910, 383–391.

Volatile Oils—Classification Based on Morphological Estimation of the Plant-substance Containing Them.—R. T. Baker, the well-known Australian botanist, in a paper read at Sydney on the native *camphor trees* of Australia, states that the species of the genus *Cinnamomum*, which have so far been recorded in Australia, are endemic, and not identical with any Indian species, as maintained by some systematists. Baker not only founds his classification upon morphological indications, but also on the anatomy of the bark and on the chemistry of the timber and of the oils obtained from the leaves and bark. Baker has found that, similar to a plan advanced by himself and Smith many years ago for the different *Eucalyptus* species, a certain agreement exists between the venation of the leaves and the chemical constitution of the essential oil of the leaves. This fact enables the oil-distiller, by the simple experiment of observing the disposition of the veins, to ascertain what class of oil can be obtained from them, and it is therefore of considerable practical importance, especially since the phellandrene oils of the eucalypts have recently found employment on a considerable scale in the treatment of refractory ores. The presence of phellandrene in oil from the leaves is indicated by the very oblique lateral venation of the leaf. It has been ascertained that of the *Cinnamomum* species which have so far been investigated in Europe and Australia, those which contain camphor have penniveined leaves, while leaves with a trinerved venation yield a camphor-free oil. The importance of this difference is evident. In its *Cinnamomum* 'rees Australia possesses a native source of camphor which as yet remains unexploited. From the leaves of *C. Oliveri* a high camphor yield has been obtained, and camphor is also present in the wood, but the oil distilled from the bark still awaits examination. *C. Laubatii*, a species little known at present, and a few other species also appear to be camphoraceous. As a result of the investigation, so far as it has gone, *Cinnamomum* trees have been planted on the North Coast with the object of utilizing them for oil and camphor production.—Schimmel's Rep., April, 1911, 38–39; from a private communication by the author.

Volatile Oils.—A new method of presentation is described by Charles H. LaWall in "Proceedings," 1910, 1121–1122.

Volatile Oils—Valueless as Ozone-Generators.—Guido O. Ruata has made an experimental investigation regarding the reputed value which is claimed for certain volatile oils, particularly turpentine oils, in absorbing ozone and eliminating it again on evaporation or combustion. His results prove the fallacy of this claim, which, though obsolete, is still frequently held as being a valuable and characteristic property of volatile

oils. The author's results of experiments have been negative throughout, both as regards pure volatile oils and the commercial so called "ozone-generators," which neither at room temperature, nor by heating, give the smallest trace of ozone to dry or moist air in its passage through them.—Pharm. Ztg., lv (1910), No. 81, 818; from Bull. delle Scienze Med. Bologna, 1910.

Volatile Oils—Method of Estimation.—Charles D. Howard recommends the following method of estimating volatile oils, which depends on the observation that when an ethereal solution of a volatile oil is *rapidly* evaporated, no appreciable loss of oil occurs: Transfer 20 Cc. of the extract to a four-ounce separatory funnel, or, in the case of preparations containing more than 5 per cent. of oil, take but 10 Cc. Add 50 Cc. of water and (except in the case of oils of the type of cinnamon and clove) two drops of strong hydrochloric acid. Shake out with three portions of ether, using 15 Cc., 10 Cc. and 5 Cc. After each extraction except the last, the ether solution may be run out into a small flask, which is kept stoppered if a series of determinations is being run simultaneously. The combined ether extracts are washed once with 10 Cc. of ether-saturated water for removal of the bulk of the alcohol, then cautiously transferred to a 10-per cent. milk bottle, rinsing the flask and tip of the funnel with an additional 2 or 3 Cc. of ether. Attach a bulb tube to the stem of the bottle and connect with a filter pump, immerse the bottle in nearly boiling water, start the pump and shake with a gentle rotary motion at first. When all danger of spirting has passed, shake *violently*, and toward the last immerse in boiling water for a few seconds, or until the application of a match flame demonstrates the complete elimination of the ether. The removal of most of the latter should require not more than two or three minutes. Finally add cold water and centrifuge. In the case of oils heavier than water, salt solution must be used as the floating agent, except with wintergreen, for which cold sulphuric acid (1 : 2) may be safely and most conveniently used.—Merck's Rep., Sep., 1911, 256; from Journ. Indust. and Eng. Chem.

New Volatile Oils — Preliminary Description.—Frank Rabak, of the Bureau of Plant Industry, U. S. Dept. of Agriculture, gives a preliminary description of several volatile oils which were obtained in the course of investigation of volatile oils and perfumery plants from new wild aromatic plants in quantities insufficient for more than a preliminary examination.

Oil of Myrica cerifera, obtained in a yield of 0.015 per cent. from the leaves and twigs of *Myrica cerifera*, L. (*Morella cerifera*, Small), collected in central Florida. A pale brown oil, having a mild, pleasant, spicy odor, and slightly bitter, sweetish, but not disagreeable taste; sp. gr. 0.9168; opt. rot., —1.5°; refract. index, 1.4945; insoluble in 80 per cent. alcohol, but soluble in one-half vol. of 90 per cent. alcohol, becoming turbid in two or more volumes; acid value, 3.5; ester value, 21; ester value after acetylation, 58.

Oil of Fluchea Fœtida, obtained in a yield of 0.025 per cent. from the fresh flowering plant collected at Orange City, Florida. A pale golden-yellow oil, having a rather mild, not unpleasant spicy odor suggestive of cineol; taste bitter, slightly pungent and mildly camphoraceous; sp. gr., 2.9329; opt. rot., —5.4°; refract. index, 1.4845; soluble in 1 vol. of 80 per cent. alcohol with clear solution, becoming slightly turbid with 5 or more volumes; acid value, 4.1; ester value, 4.4; ester value after acetylation, 104.

Oil of Magnolia Glauca, obtained by distillation of the leaves in Florida in a yield of 0.05 per cent. A pale yellow oil; odor very pleasant and spicy; taste distinctly spicy and sweet, yet persistently bitter; sp. gr., 0.9240; opt. rot., +3.96°; refract. index, 1.4992; insoluble in 80 per cent. alcohol, but soluble in 3½ vols. of 90 per cent. alcohol; acid value, 1.8; ester value, 13; ester value after acetylation, 28.

Oil of Cedrela odorata, L. (Syn. *Cedrela cedro*, Loefl.; *Cedrus odorata*, Mill.) was distilled from the wood of a box in which a shipment of other material from Mexico was contained. The yield of oil was 0.3 per cent. It had a golden-yellow color, a faintly aromatic, cedar-like odor, and a fatty, bitter, aromatic taste; soluble in 6 vols. of 80 per cent. alcohol with turbidity; sp. gr., 0.947; refract. index, 1.5038; acid value, 5.9; ester value, 41.5; ester value after acetylation, 51.—Midl. Drug. and Pharm. Rev., Nov., 1911, 484–486.

Oil of Alpinia Galanga, Willd.—Composition and Constants.—Schimmel & Co. have received and examined a sample of oil distilled from *Alpinia Galanga*, Willd., by Dr. A. J. Ultée, of Salatiga, Java, who mentions the following constituents: pinene, cineol, camphor, and methyl cinnamate. The oil as received was of a lemon-yellow color, had a peculiar, strongly aromatic odor, and gave the following constants: Sp. gr. (15°), 0.9847; opt. rot., +4° 30′; refract. index (20°), 1.51638; acid number, 1.8; ester number, 145.6; soluble in equal volume of 80 per cent. alcohol, becoming opalescent with 3 vols. The ester number of the oil indicates the presence of 42 per cent. of methyl cinnamate.—Schimmel's Rep., Oct., 1910, 148.

Oil of Alpinia Galanga—Properties and Composition.—The following additional particulars respecting the characters of the oil of *Alpinia Galanga* are contributed by Ultée in a paper published in "Mededeelingen von het Algemeen-Proefstation op Java to Salatiga" (II Series, No. 45, 1910). The pale yellow oil of agreeable odor was obtained from the green rhizomes; the yield being 0.04 per cent. and the constants as follows: $d_{29°}$ 0.968, $a_{27.5°}$ about +6°. The oil contains 48 per cent. methyl cinnamate (m. p. 34°), while its cineol content (b. p. of the cineol 175 to 177°; m. p. of the iodol compound 112°) is probably from 20 to 30 per cent. A hydrocarbon with a turpentine-like odor, b. p. 151 to 161°

($d_{250°}$ 0.8566 ; $a_{270°}$ − 14.90°), probably d-pinene, as well as camphor (m. p. 170 to 175°) was also detected. An essential oil is also obtainable from the leaves of *Alpinia Galanga*, but the yield in this case is exceedingly slight. This oil most probably contains methyl cinnamate, for upon saponification it yielded cinnamic acid.—Schimmel's Rep., April, 1911, 19.

Angelica-Root Oil—Presence of a Crystalline Lactone.—E. Böcker and A. Hahn have isolated from the last runnings (200 Gm.) of angelica-root oil 10 Gm. of a crystalline lactone having the empirical formula of $C_{15}H_{16}O_3$. Crystallized from ethyl ether and light petroleum, it had the melting point of 83°, boiled without decomposition at 250°, and had the optical rotation a_D + 0° C. It is an unsaturated body, insoluble in cold or hot aqueous NaOH or KOH, but dissolves in hot alcoholic potash solution. When brominated in glacial alcoholic acid solution it yields a dibromide melting at 143–145° C. with decomposition. Its stability and its tendency to reconstitution after saponification lead to the inference that it is a γ-lactone.—Schimmel's Rep., April, 1911, 21 ; from Journ. f. prakt. Chem., *83* (1911), 243.

Oil of Anise—Effect of Age on its Composition.—A. W. Knapp directs attention to certain changes which take place in oil of anise with age. The specific gravity increases, the optical rotation passes from left to right, the solubility in strong and in dilute alcohol increases, and the index of refraction decreases. Isoanethol is probably formed by polymerization. These observations were made on a sample of oil of anise purchased by Mr. Alcock twenty-three years ago from a well-known firm, who has every reason to believe that it is a genuine sample of Chinese oil obtained from star anise (*Illicium verum*).—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1910, 371–375.

Aniseed Oil—Composition of a Pure and an Adulterated Sample.—H. R. Jensen has subjected a sample each of pure and of adulterated oil of anise to fractionation and examination, obtaining figures which will possibly be useful to experimenters. The results are given as follows :

Pure Oil.—S. g. (20°) 0.9814. Optical rotation —0° 6′. Ref. index (25°) 1.5505. Solidifying point 16° C. Melting point 17.5° C. Sol. in 1¾ vols. 90 per cent. alcohol.

Distillation Temperature.	No. of Fraction.	Size Fraction.	Ref. Index 21°.	S. G. 17°.	Opt. Rot.	M. Pt.
225.5°-229°	1	10%	1.5373	0.957	—0° 45′	12°
229°-230°	2	15%	1.5459	0.971	—0° 38′	15°
230°-231.5°	3	20%	1.5536	0.983	—0° 5′	19.3°
231.5°-232.°	4	20%	1.5565	0.985	0°	19.5°
232.7°-235°	5	20%	1.5574	0.989	+0° 8′	20.5°
235°(-250°)	Residue	15%	1.5565	0.9885	—	18.5°

85 % of this oil distilled between 225.5° and .235°.

Adulterated oil (with possibly a camphor-oil terpene and sesquiterpene). S. g. (20°) 0.9755. Optical rotation -0° 10′. Ref. index (25°) 1.5465. Solidifying point 13.5° C. Melting point 15° C. Soluble in 2¼ vols. 90 per cent. alcohol.

Distillation Temperature.	No. of Fraction.	Size Fraction.	Ref. Index 21°.	S. G. 17°.	Opt. Rot.	M. Pt.
226°-229°	1	10%	1.5283	0.946	0°	Does not freeze at —5°
229°-231°	2	15%	1.5434	0.9685	—0° 10′	Does not freeze at — 2°
231°-233°	3	20%	1.5500	0.978	+0° 6′	16°
233°-235°	4	20%	1.5534	0.983	+0° 4′	17.5°
235°-243°	5	20%	1.5545	0.9847	+0° 8′	18°
Above 243°	Residue	15%	1.5522	0.982	—	—

Only 65 per cent. of this oil distilled between 226°–235°, and from the fact that pure anethol has a s. g. 0.986 (25°), ref. index 1.5585 (25°), this constituent is evidently not present in its correct proportion. The first fractions had a disagreeable abnormal odor; the oil, however, is apparently not adulterated to quite the same extent as the oils described by Parry. The adulterant is apparently dextro-rotatory.—Pharm. Journ. and Pharmacist, Dec. 24, 1910, 759.

Oil of Anise—Adulteration with Fixed Oil (?).—Maria Theresa Bruzzone has observed a case of adulteration of anise oil, which she attributes to the addition of some drying fatty oil. She found that, while engaged in preparing *Liq. ammon. anis.*, the alcoholic solution of the oil turned highly turbid with ammonia, and on being left standing the mixture gave a flocculent precipitate in large flakes.—Schimmel's Rep., Oct., 1911, 21; from Boll. Chim. Farm., *50* (1911), 468.

Star Anise Oil—Terpene Constituents.—In the lowest fractions derived from a parcel consisting of many tons of star anise oil, Schimmel & Co. have detected the following terpenes: (1) *d-α-Pinene*, in a fraction boiling between 155° and 158° C.; (2) *d-β-Phellandrene*, in a fraction boiling between 171° and 174° C. In addition to these, the first runnings under examination contained considerable quantities of fractions boiling between 163° and 168° C., with a marked odor of turpentine. Each of the terpenes named, however, only constituted a fraction of perhaps 0.01 per cent. of the original oil.—Schimmel's Rep., Oct., 1911, 86.

Oil of Star Anise—Adulteration.—Ernst J. Parry mentions that it is many years since star anise oil arrived in England in anything but a genuine condition, as on the last occasion when adulterated oil was shipped to London the energetic measures taken by the interested parties soon stamped the adulteration out. A new outbreak of adulteration has just

taken place, but fortunately of quite a temporary nature, as the shipments now arriving are of excellent quality. He has examined a number of the samples of the parcels involved, all of which were quite similar in nature, and had the following characters:

Specific gravity at 20°	0.9675 to 0.9740
Refractive index at 20°	1.5460 to 1.5475
Melting-point	12° to 15°
Congealing-point	10.5° to 12°
Optical rotation	—0° 15′ to +0° 35′

It will be noticed that the specific gravity is abnormally low, and does not correspond with pharmacopœial requirements, while the melting- and congealing-points are also very low. The refractive index is lower than he has ever found for pure aniseed oil, which has a value between 1.5520 and 1.5580 or thereabouts. The slight dextro-rotation indicates nothing, as some samples of pure staranise oil are faintly dextro-rotatory. The figures obtained by the author in a complete examination of a bulked sample made from a number of the above-described samples, prove conclusively that these samples were not genuine anise oil, and, taken in conjunction with the peculiar odor and taste, indicate strongly that the adulteration took the form of the addition of some foreign oil. The most probable adulterant is some fraction of camphor oil.—Chem. and Drug., Nov. 5, 1910, 45.

Oil of Asarum Arifolium—Characters and Constituents.—Emerson R. Miller has obtained by steam distillation from the rhizome and roots of *Asarum arifolium*, a plant commonly known as "heart-leaf," and growing from Virginia to Florida, a volatile oil reminding in its odor and taste of oil of sassafras. The yield from air-dried material was from 6.0 to 7.5 per cent. The sp. gr. of this oil was 1.0585 to 1.0613 at 15° C.; opt. rot., —3°; refract. index, 1.53146. Besides safrol, which appears to be the principal constituent of this oil, the following constituents were determined: Levo-pinene; eugenol; another phenol; methyl-eugenol; methyl-isoengenol; asarone; a sesquiterpene. A very similar oil is obtained from the leaves of the plant, but in much smaller amounts.—Proc. Alabama Pharm. Assoc., 1910, 56–58.

New Artemisia Oils—Yield, Characters and Constants.—Since describing the oils distilled from three new species of *Artemisia* (see Proceedings 1905, 753), Frank Rabak, of the Bureau of Plant Industry, U. S. Dept. of Agriculture, has given attention of two other species, *Artemisia biennis*, Willd., and *A. serrata*, Nut., both of which yield volatile oils.

Oil of Artemisia Biennis was obtained by steam distillation from the partially dry fresh herb collected in South Dakota, in a yield of only 0.03 per cent. It is deep brownish-red, had a sweetish aromatic odor, and a fatty, sweetish aromatic taste, devoid of pungency but developing a slight

bitter after taste. Sp. gr. at 25° C, 0.893; spec. rotation, + 4.39°; index of refract., 1.5181; soluble with turbidity in 4 vols. of 95 per cent. alcohol —the turbidity remaining in 22 vols. The chemical constants were: Acid val., 0; ester val., 16; ester val. after acetylization, 60—indicating 5.6 per cent. of esters and a total amount of 17.28 per cent. of alcohols, free alcohols amounting to 12.88 per cent.

Oil of Artemisia Serrata, from plants collected during the flowering stage at Perkins, Cal., was obtained in a yield of 0.3 per cent. It was reddish-brown, had a strong aromatic odor, rather unpleasant, decidedly thujone-like and similar to the odor of wormwood oil; taste extremely bitter and aromatic; sp. gr. at 35° C. 0.913; opt. rot., + 6.8; index of refract., 1.4602; soluble in one-half vol. of 80 per cent. alcohol with clear solution. The chemical constants were: Acid val., 1.6; ester val., 10; ester val. after acetylization, 43—these figures corresponding to 3.5 per cent. ester (= 2.7 per cent. alcohol), 12.2 per cent. total alcohol, and 9.5 per cent. free alcohol. The author appends a table comparing the constants of this oil with other oils of the same genus having a thujone-like odor.— Midl. Drug. and Pharm. Rev., July, 1911, 283–284.

Oil of Artemisia Cœrulescens, L.—Yield and Properties.—Schimmel & Co. have obtained from *Artemisia cœrulescens*, L., a plant occurring on the littoral of the Mediterranean and, in parts, on that of the Atlantic, 0.24 per cent. of an oil which, in its odor, showed a certain similarity to the oil of hyssop, but at the same time reminded somewhat of ambrette. The plant was received from Turin under the name of "Erba Santa Maria." The oil appeared at room temperature as a brownish, butter-like mass, studded with white crystals, which only between 35° and 40° C. melted into a pale brown liquid. Its constants were determined as follows: $d_{40°}$ 0.9179, a_D—50° 50′, acid v 11.3, ester v 42.0, insoluble in 80 per cent. alcohol, soluble in any proportion in 90 per cent. alcohol, with separation of a solid substance. The crystals isolated from the oil, after being recrystallized from alcohol, formed fine, white odorless needles, m. p. 108° C.; so far their chemical characteristics have not been further investigated.—Schimmel's Rep., Oct., 1911, 104.

Balan Oil—A New Oil from Java.—Schimmel & Co. have received rom Antwerp a small sample of an oil distilled in Java from a plant which has not yet been identified, but certain parts of which are used by the natives as a remedy for worms and also as a nervine. The oil, called "Balan Oil," which was obtained in a yield of about 0.05 per cent., is of a brown color, has an intense odor, somewhat resembling that of bitter orange oil, and was found to possess the following constants:—Sp. gr. at 15°, 0.9042; $n_{D20°}$, 1.47715; acid val., 13.0; ester val., 20.5. Soluble in one half its vol. and more of 90 per cent. alcohol. The deep color of the oil prevented the accurate determination of the direction of its optical

rotation, which in any case, however, must be very slight. It yielded with sodium bisulphite a solid addition compound from which a body with an odor reminding of decylicaldehyde was isolated.—Schimmel's Rep., April, 1911, 123.

Bayberry Oil—Distillate from Mauritius Fruits.—A sample of bayberries grown in Mauritius, received by Schimmel & Co., from the Imperial Institute London, yielded on distillation 3.3 per cent. of a light-brown oil, which in odor and other properties resembled very nearly the West India Bay Oil from leaves. Sp. gr. at 15°, 0.0893; opt. rot., — 1°20′; refract. index, 1.51902; eugenol content, 70 per cent.; soluble in 0.8 vol. and more of 80 per cent. alcohol. Some years ago an oil was distilled from bay berries grown in Bermuda (see Proceedings 1905, 754); but this differed perceptibly in its odor from oil of bay leaves, and also deviated from the latter in the composition of its non-phenols.—Schimmel's Rep.. Oct. 1910, 21.

Oil of Bergamot—Preparation.—In a description of the oil of bergamot industry in Sicily, given in "La Perfumerie Moderne," the apparatus which was used more than two decades ago for the extraction of the oil from citrus fruits is reproduced in photograph—this identical apparatus being illustrated in an excellent cut in the "Proceedings" of 1890 (pp. 685–6), together with the description of its use. Reproducing the article then written by Mr. Rizzuto, the "Chemist and Druggist" says that after a lapse of two decades these observations are still applicable, although the part regarding the method of distillation appears to have been forgotten. The remarks in regard to adulteration are particularly interesting when it is recalled that examination of many samples during the past few months has revealed adulteration in three forms, viz., admixture with (1) terpinyl acetate, (2) lemon terpene, and (3) so-called synthetic bergamot oil and other substances. These are what analysis reveals. Mr. Rizzuto spoke from knowledge of the Sicilian custom, and it may be observed that the use of artificial or synthetic adulterants was established when the earlier article was written. Regarding the production of bergamot oil, it is added that the pressing of bergamot is carried on from November to April, and a staff of six men can deal with about 8000 fruit per day, two being occupied with the peeling and the remainder with the extraction of the juice. On an average, 8000 bergamots will produce about 3 kilos of oil and 620 liters of juice, green fruit being the richest in oil.—Chem. and Drugg., Oct. 22, 1910, 52.

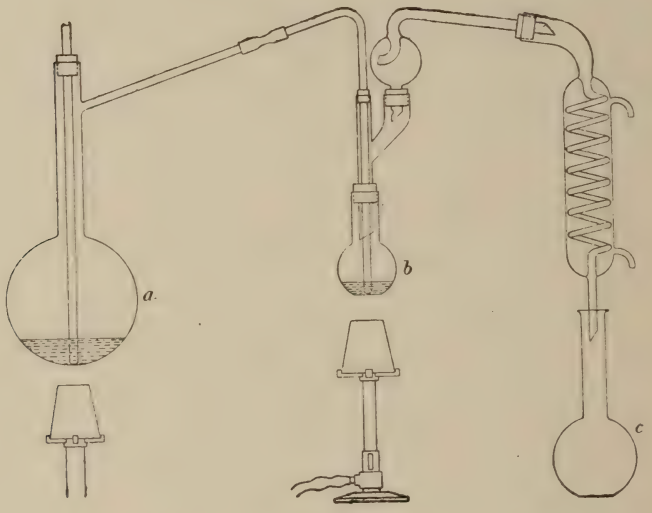
Oil of Bergamot—New Constituents.—In the examination of a fraction which was obtained to the amount of 25 per cent. in the course of the commercial manufacture of terpene-free bergamot oil, F. Elze determined the presence of several new constituents of that oil. After saponification, distillation by steam and fractionation, this sample presented an oil hav-

ing the sp. gr. at 15°, 0.890; opt. rot., —10°, which on treatment with phthalic acid anhydride yielded a small quantity of an alcohol, which proved to be *dihydrocuminic alcohol.* After oxidizing with Beckmann's chromic acid mixture, this alcohol yielded an aldehyde boiling at 235° C., with an odor resembling cumin. Regenerated from the semi-carbazone (m. p. 198° to 199° C.), its constants were: sp. gr. at 15°, 0.970; opt. rot., —39°. The principal part of the alcohol mixture consisted of *nerol* (sp. gr. at 15°, 0.880) identified by its tetrabromide (m. p. 118°), and diphenylmethane (m. p. 50° C.) In the fractions which did not react with phthalic acid anhydride, the author discovered *terpineol* (m. p. 35° C.) —a discovery of considerable importance, as it has recently been found that bergamot oil is occasionally adulterated with terpinyl acetate. The proportions of terpineol found in the sample are not mentioned.—Schimmel's Rep., Oct., 1910, 64; from Chem. Ztg., *34* (1910), 538.

Bergamot Oils—Italian Practice of Raising the Ester-Value of Inferior Oils.—Mentioning in some detail an examination of two samples of bergamot oil which were proven to contain triethyl citrate, Schimmel & Co. state that in recent years it has become a practice in Italy to bring inferior bergamot oils up to the required ester content by carefully "adjusting" them with tri-ethyl citrate in such manner that the addition does not throw the physical constants outside the limit of values which apply to pure bergamot oil. In further experiment it was found that the added citric acid ester remains behind in the residue when the oil is evaporated on the water bath, and can there be recognized by the increase in the saponification number—this affording a ready means for proving any adulteration of this description. The experiments showed that almost the whole of the citric acid ester remains behind; consequently a determination of the saponification of the residue makes it possible to form an approximate estimate of the quantity of ester added. The determination is carried out with 1.5 to 2.0 Gm. of oil, using the apparatus shown by Fig. 68, as follows: The acid and ester numbers are ascertained in the usual manner, and the contents of the saponification flask are evaporated to dryness after adding a few drops of seminormal potash liquor. The residue is dissolved in about 5 Cc. water acidulated with 2 Cc. dilute sulphuric acid. From the flask *A*, fitted with an ascending tube, a powerful current of steam is generated, by which, in the space of half an hour, 250 Cc. is distilled over into the measuring flask *C*, in such manner that the contents of the saponification flask *B*, are kept down to about 10 Cc. with a small flame. Afterwards 100 Cc. more is carried over in the same manner. The distillate, after a few drops phenolphthalein solution with seminormal potash liquor (or for the sake of accuracy, better with decinormal solution) have been added, is titrated until it assumes a red color. The first 250 Cc. contain very nearly the entire volatile acids, as the next 100 Cc. invariably consume only 0.1 to

0.2 Cc. of decinormal solution. From the quantity of potash solution required to neutralize the entire distillate the acid number is calculated for the entire weight of the bergamot oil used. The difference between the saponification number of seven pure oils and the acid number determined as here described, was found to vary from 5.2 to 6.9. Hence oils with a greater difference must be regarded as suspect or adulterated. So, for example the two oils initially mentioned, showed an increase of 16.8.

FIG. 68.



A pure oil to which 1 per cent. of diethyl citrate was added, showed an increase of 11.4 and when 2 per cent. was added it showed 18.4. The method is applicable to the detection of esters of which the acids are not readily volatilized—such as the esters of succinic, oxalic, tartaric, and citric acids—but not to the esters with volatile acids, such as terpinyl acetate and glyceryl acetate, all of which are used as adulterants. For the latter, special processes must be used. For the non-volatile acid esters, a table accompanying the article gives data which will prove useful in the examination of oil of bergamot by the method recommended, and which may possibly serve well for the detection of these in other volatile oils.—Schimmel's Rep., Oct., 1910, 56 to 64.

Callitris Oil—New Phenolic Constituent.— Baker and Smith observe that many Australian species of *Callitris* yield timber possessing a high power of resistance against the attacks of white ants, a property which they presume to be due to a hitherto unknown phenol, named by them

Callitrol. The wood of *Callitris glauca*, for instance, when subjected to steam-distillation, yields 0.82 per cent. of an essential oil which in the

crude state forms a semi-solid mass. When the oil is pressed through a cloth the greater part of it remains behind in the form of a solid cake. The sp. gr. (at 16°) of the liquid portion is 0.9854; it is soluble with its own volume of 70 per cent. alcohol; when more than 3 vols. is added the solution turns cloudy. With 80 per cent. alcohol it makes a mixture which is clear at first, but in this case also the dilute solution becomes slightly cloudy. By repeated fractionation a fraction boiling between 250° and 252° C. was isolated ($d_{15°}$ 0.9266; $n_{D15°}$ 1.4926; insoluble in 90 per cent. alcohol), apparently consisting chiefly of sesquiterpenes. The oil also contains free acids, esters, and the phenol, callitrol, referred to above, which gave a few color-reactions, such as turning red when the solution in acetic acid was diluted with sulphuric acid. So far it has not been possible to ascertain the constitution of callitrol. The solid portion mentioned above crystallizes from alcohol in hexagonal prisms, melts at 91°, and, as shown by a combustion, consisted of guajol, $C_{15}H_{26}O$; $[\alpha]$—29° (in 5 per cent. alcoholic solution). Guajol is also present in the oil from the wood of *Callitris Macleyana* (stringy bark pine), of which a yield of 0.558 per cent. oil, forming a semi-solid deep red liquid, was obtained. It likewise occurs in the oil from *Callitris intratropica* to such an extent that guajol crystals frequently appear upon the surface of the newly-cut wood. The same phenomenon may be observed in the wood of other species of *Callitris*. The oil from the wood of *Callitris intratropica* also contains callistrol. Several species of *Callitris* also yield a resin possessing properties resembling those of African sandarach (from *Callitris quadrivalvis*), but as no rational method of collecting the resin is yet known, it is not remunerative to gather it at the prices now ruling.

The authors have prepared and examined the volatile oils obtained from different parts—leaves, wood, fruits, etc.—of a large number of species of *Callitris*, many of these oils containing the new phenolic body (callitrol) and by their examination of these oils have been enabled to subdivide the *Callitris* species into groups of which the botanical attributes agree with the presence of d-limonene, l-limonene, and pinine. It is practicable here only to mention the species so examined by their botanical title, viz.: *Callitris robusta*, R. Br.; *C. verronicosa*, R. Br.; *C. propinqua*, R. Br.; *C. glauca*, R. Br.; *C. arenosa*, A. Cunn.; *C. intratropica*, Benth. et Hook.; *C. gracilis*, R. T. Baker; *C. calcarata*, R. Br.; *C. rhomboidea*, R. Br.; *C. Tasmanica*, Baker et Smith; *C. Drummondii*, Benth. et Hook. fil.; *C. Muelleri*, Benth. et Hook. fil.; *C. oblonga*, Rich.; *C. Macleayana*, F. v. M. —Schimmel's Rep., April, 1911, 25–30; from "A Research on the Pines of Australia," Sydney, 1910, 50, 60, 79.

Cananga Oil—Constituents.—Elze has isolated two new constituents, nerol and farnerol, from Java cananga oil. The *nerol* was isolated by saponifying the portions of the oil containing geraniol, fractionating the saponified oil *in vacuo*, and purifying the nerol in the usual manner. About

0.2 per cent. of nerol was then obtained, which had the following contents: Sp. gr. at 15°, 0.880; opt. rot.=+0. Its diphenylmethane melted at 50° to 50.5° C. The *farnesol* was obtained from the high-boiling portions of the oil by means of phthalic anhydride in the amount of about 0.3 per cent. It had the b. p. 145° to 146°, the sp. gr. at 15° 0.895, and the opt. rot., =+0° C. The author was also able to detect the presence of

Nerol in oil of bergamot, myrtle oil, oil of champaca flowers, and oil of Spanish wormseed; while

Farnesol was found also in balsam of Peru, balsam of tolu, and in palmarosa oil.—Schimmel's Rep., October, 1910, 30; from Chem. Ztg., 1910, 857.

Cardamom Root Oil—Yield and Properties.—From cardamom roots received from Indo-China, Schimmel & Co. have obtained, in a yield of 0.64 per cent., a lemon-yellow oil possessing a peculiar aromatic odor, which bears no resemblance to that of the oil from seed. So far, attempts to ascertain the parent-plant of the oil have been unsuccessful. The oil gave the following constants: $d_{15°}$ 0.9066; a_D—32° 57′; $n_{D20°}$ 1.48151; acid v., 3.7; ester v., 8.9; ester v., after acetylation, 96.7. The oil was soluble in 0.5 vols. 95 per cent. alcohol; when more alcohol was added the mixture rapidly turned turbid, and did not become clear again until the solvent had been increased to 4 vols. The results of further examination, which is given in some detail, show the presence in this cardamom-root oil of cineol, bisalbolene and a paraffine—bisalbolene being the principal constituent.—Schimmel's Rep., Oct., 1911, 105.

Oil of Chamæcyparis Lawsoniana, Parl.—Yield and Constants.—In 1889 Schimmel & Co. reported on an oil distilled from (the wood of ?) *Chamæcyparis obtusa*, Endl., a coniferous tree indigenous to Japan. They have now distilled the oil from a second species, *C. Lawsoniana*, Parl., a stately tree cultivated in German gardens. The material, supplied from Holstein, yielded about 1 per cent. of a lemon-yellow oil, having an odor reminding of savin or of cypress oil, and giving the following constants: sp. gr. (15°), 0.9308; opt. rot., =+23° 48′; index of refract., 1.48844; acid number, 3.7; ester number, 61.6; ester number after acetylation, 78.8; soluble in one-half its vol. of 90 per cent. alcohol, with 1 to 3 vols. passing turbidity. An aldehyde was insoluble in small quantities, which, judging by its odor, is perhaps identical with laurinic aldehyde.—Schimmel's Rep., Oct., 1910, 146.

Chenopodium Oil—Constants and Constituents.—E. K. Nelson examined four samples of chenopodium oil procured in Maryland, where they were produced. These oils gave the following constants: Sp. gr., 0.955 to 0.969; opt. rot. —5.4° to —8.8°; refract. index, 1.4723 to 1.4726; sol in from 3 to 7 vols. of 70 per cent. alcohol. In addition to ascaridol ($C_{10}H_{16}O_2$), isolated and named by Schimmel & Co. in 1908,

Mr. Nelson noted also the presence of cymene and of d-camphor, both of which were mentioned as constituents by S. & Co.: but the main purpose of his paper is the conversion of ascaridol into glycol ($C_{10}H_{18}O_3$), which results by the assimilation of 1 molecute of water, and a study of the chemical constitution of these bodies.—Schimmel's Rep., Oct., 1911, 98–99; from Journ. Amer. Chem. Soc., *33* (1911), 1405.

Oil of Chenopodium—Reliability as a Vermifuge.—Gehe & Co. direct attention to the reliability of American wormseed oil as an anthelmintic, a fact that is recognized in the United States, but has not received much attention in Germany. The oil is the product of distillation of the seeds and herb of *Chenopodium anthelminticum* and contains as active constituent from 60 to 70 per cent. of ascaridol ($C_{10}H_{16}O_2$)—a substance having an exceedingly disagreeable odor (reminding when diluted of "scatol") and requiring further chemical investigation. It contains also about 20 per cent. of cymol. Owing to its repugnant taste and odor, the oil is preferably given in form of capsules, each containing 16 drops with 0.2 Gm. of menthol. Three of these are given two hours apart, for two days, following the third dose each day by castor oil. According to the age of children the dose is reduced to one-half the number of drops. The remedy is infallible against *Ascarides*; less useful against *Oxyurides*.—Pharm. Ztg., lvi (1911), No. 32, 321.

Cinnamon-Bark Oil—Characters and Constants of the Complete Normal Distillate.—John C. Umney and C. T. Bennett contributed a very interesting paper on cinnamon-bark oil at the 1910 meeting of the British Pharmaceutical Conference, which has evidently been suggested in refutation of an assertion made in a paper read before the Perfumers' Association in New York by Dr. F. C. Dodge, to the effect that "Oils of equal purity as regards sorts may vary enormously in value, and indeed an impure oil may sometimes be of better quality than a strictly pure one," Dr. Dodge citing as an example that "an oil of cinnamon bark, low in aldehyde, may be, and possibly often is, improved by the addition of aldehyde from other sources." Against this statement the authors strongly protest. They say there can be no two opinions about the beautiful aroma and sweet taste of cinnamon-bark oil and the very great advantage it possesses in flavor over cassia oil or artificial cinnamic aldehyde, although for the purpose of soap-perfuming and similar uses cassia oil is undoubtedly valuable. But, in any event, the authors maintain that cinnamon-bark oils should be composed of the complete normal distillate and not of fractions thereof. They have recently distilled considerable quantities of cinnamon bark, with the view of determining the percentage yield and characters of oils distilled from the various grades of cinnamon—from the unbroken quills to chips—repeating experiments conducted in their laboratory in 1893, and were struck with the fact that, taking every precaution in the

collection of all the fractions of the oil, they could not obtain a higher specific gravity than 1.016, whereas their own previous distillates, and those of other English distillers, showed specific gravities of 1.024 to 1.029. In their present experience, the following yields and specific gravities were obtained :

Bold quills:	yield, 0.84 per cent.;	spec. grav.	1.006.
Broken quills:	" 0.71 per cent.;	" "	1.016.
Chips:	" 0.56 per cent.;	" "	0.996.

These results, taken together with these obtained by other distillers (given in a number of tables) clearly demonstrate the necessity for a revision of the constants at present accepted for normal cinnamon bark oil. Moreover, the authors conclude that, if cinnamon oil is to be viewed as a flavor, to be judged by its sweetness and delicacy, it should be the light normal distillate ; if as a remedial agent, required to contain a definite percentage of aldehyde, let us have pure cinnamic aldehyde (as does the U. S. P. though *Cinnamon Cassia Oil* is also official) or 80–85 per cent. cassia oil.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy) 1910, 376–382.

Mauritius Cinnamon Oils—Production from Bark and Leaf.—According to the " Journal of the Imperial Institute " in London, a *cinnamon bark* is collected in the Island of Mauritius which, in the judgment of the dealers, more or less equals a good Seychelles cinnamon. Distillation by steam yielded 0.8 per cent. of an oil of apparent good quality, but the available quantity was insufficient to permit an examination. According to the same authority, *cinnamon leaves* from Mauritius were found to yield 1.1 per cent. of oil, but owing to the smallness of the available quantity could also not be closely examined, though, judging from the odor, this oil was also of good quality. It is the intention of the Imperial Institute to cause the distilling experiment to be repeated in Mauritius with a larger quantity of leaves, in order to make it possible to form an opinion of the value of the oil.—Schimmel's Rep., Oct. 1910, 36 ; from Bull. Imp. Inst., 8 (1910), 2.

Cassia Oil—Gravimetric Method of Estimating Cinnamic Aldehyde.—The exact estimation of cinnamic aldehyde in cassia oil by the bisulphite method being sometimes obscured by the appearance of a granular separation at the plane of contact of the oil and water, C. F. Yates proposes to obviate the trouble by adopting a gravimetric method, depending on the extraction of those portions of the oil which are not in combination with the bisulphite, and after driving off the ether, weighing them.

Schimmel & Co., commenting on the above, observe that this method is not new, but was originally mentioned by them (April, 1890) at the time when the bisulphite method was introduced. For various reasons, however, they quickly abandoned it and replaced it by the much handier vol-

metric method (October, 1890), in favor of which they say that it has most successfully stood the test of many years.—Schimmel's Rep., Oct., 1910, 33; Perf. and Ess. Oil Rec., 1910, 171.

Citronella Oil—Standard.—John C. Umney proposes characters and tests of purity and odor value, suitable as a standard for citronella oil, the accuracy of which has been tested by the co-operation of C. E. Parry and the analytical chemists of several of the largest soap manufacturers. The maximum difference in geraniol from highest to lowest was found not to exceed 0.5 per cent., which is certainly sufficiently close for all commercial purposes. Criticism and comment upon these characters and the tests and their working are invited. They are as follows:

Sp. gr. at $\frac{15.5^\circ\ C.}{15.5^\circ\ C.}$	8.898 to 0.910
Optical rotation	-7° to -13°
Acidity expressed as acetic acid	Not above 0.25 per cent.

Soluble in 2.3 vols. of 80 per cent. by vol. alcohol, and clear on further addition of the alcohol up to 10 vols.

Acetylizable constituents stated as geraniol, at least 58 per cent.—Chem. and Drug., Sept. 2, 1911, 53.

Ceylon Oil of Citronella—Valuation on Geraniol Content.—Several years ago Umney suggested that Ceylon citronella oil should have a geraniol-content of not less than 60 per cent., and Parry has suggested that the price of this oil should be based entirely upon its geraniol-content. Umney now has made some additional suggestions on the subject. He divides Ceylon citronella oils, according to their geraniol-content, into three groups, showing percentages of 56–60, 60–64, and 64–68 per cent. respectively, and proposes that they should be valued accordingly. Mr. Umney believes that the difficulty of submitting oils to examination in Ceylon are not insuperable; but in any case, the sale of Ceylon citronella oil should be conducted on the basis of its acetylizable constituents.

Java Citronella Oil, on the other hand, being a much more valuable oil, might perhaps be valued on the basis of its citronellal-content as the determining factor.—Schimmel's Rep., Oct., 1910, 37; from Perf. and Ess. Oil Record, *1* (1910), 78.

Oil of Citrus Hystrix—Yield from the Rind of the Fruit.—An oil has been distilled at Buitenzorg from the peel of *Djoeraek Poervet* (*Citrus Hystrix*, D. C.; *C. Papedia*, Mix., N. O. Rutaceæ). The yield was 4 per cent. of an oil containing 40 per cent. citral and having the specific gravity at 26° of 0.942; opt. rot. + 9°. A sample handed to Schimmel & Co. by Dr. de Jong of Buitenzorg, last year, was evidently identical with this oil, but in the meantime it had become greatly resinified, as was

shown in the first place by the greatly increased specific gravity: $d_{15°}$ 0,9654, a_D + 7° 18′ $n_{D20°}$ 1,48277, soluble in its own vol. and more of 80 per cent. alcohol. The oil was of a pale yellow color and had an odor resembling that of lemon.—Schimmel's Rep., April, 1911, 51.

Oil of Copaiba—Distinctive Characters of its Caryophyllene Constituent.—According to Wallach, oil of copaiba contains the sesquiterpene caryophyllene, which is also present in oil of cloves both from flowers and stalks. More recently, however, it has been shown that the caryophyllene of clove oil is not a single body, but consists of two if not three, isomers, distinguished as α-, β-, and γ-caryophyllene, which have different optical activity; the nitrosochloride and nitrosate which have been described are derived from α-caryophyllene, and the nitrosite from the β isomer. Oil of copaiba has now been re-examined by E. Deussen and A. Hahn to see which of the isomeric caryophyllenes it contains; the results showed that it differs very materially from the caryophyllene of clove oil, the optical activity of fractions of the latter diminishing with increasing boiling point, whereas the two increase together in the case of copaiba oil. The conclusion arrived at was that the caryophyllene of copaiba oil is the α- variety, and that a second sesquiterpene is present.—Pharm. Journ. and Pharmacist, Oct. 22, 1910, 492; from Chem. Ztg., Aug. 18, 1910, 872.

Curcuma Oil—Characters and Constants.—F. Bacon (Philippine Journ. of Sc., 1910, A., 261) has prepared and examined curcuma oil, the yield by distillation from the raw material being about 2.4 per cent. The oil was of a brown color, soluble in any proportion in alcohol of 75 per cent. or stronger: $d\ \frac{30°}{30°}$ 0,930, $a_{D30°}$ 8,6 (+ ?) $n_{D30°}$ 1,5038, ester v. 81.

An oil distilled by Schimmel & Co. (yield 3,23 per cent.) gave the following constants: $d_{15°}$ 0,9430, a_D — 23°, $n_{D20°}$ 1,51236, sap. v. 1,6, ester v. 7,8, ester v. after acet. 30.0. This oil, which was of a golden yellow color, was insoluble in 10 vols. of 80 per cent. alcohol, but soluble in 0.4 vol. 90 per cent. alcohol. It gave a pronounced phellandrene reaction.—Schimmel's Rep., April, 1911, 56.

Oil of Southern Cypress—Characters and Constituents.—A. F. Odell prepared an alcoholic extract from the saw dust of the southern cypress (Taxodium distichum, Rich.) with 95 per cent. alcohol, and obtained from this extract by distillation under diminished pressure (35 Mm.) a fraction of oil boiling between 180° and 190°, and another boiling between 217° and 222°. From the first fraction he isolated a body having the composition $C_{12}H_{20}O$, which he has named *cypral* and which he believes to represent an aliphatic aldehyde. This has the following properties: b. p. 182° to 185° (35 Mm·); Sp. gr. $\frac{20°}{40°}$ 0.9469; opt. rot. to the right; index of refract., 1.5040. The second fraction contained a hitherto unknown sesquiterpene, called *cypressene* by Odell, and possess-

ing the following constants: b. p. 218° to 220° (35 Mm.), 295° to 300° (778 Mm.), $d_{4°}^{18°}$ 0,9647, $[\alpha]_{D20°}$ + 6,53°, $n_{D22°}$ 1,5240. The mol. refr. was found to be 64,66 (calc. 62,55) which points to the presence of a double bond.—Schimmel's Rep., Oct. 1911, 87; from Journ. Amer. Chem. Soc., *33* (1911) 755.

Oil of Dacrydium Franklinii, Hook. f.—Characters and Constants.—Schimmel & Co. have received from Melbourne, Victoria, an oil distilled from the wood of the "Huon Tree" (*Dacrydium Franklinii*, Hook. f.; *D. huonense*, A. Cunn.), which had the following properties: Color, pale yellow; odor, pronouncedly of methyl-eugenol, which is its principal constituent; sp. gr. (15°), 1.0443; opt. rot., =+0° 6′; index of refract., (20°), 1.53287; acid number, 0.9; ester number, 1.5; soluble in 5.2 vols. and more of 60 per cent. alcohol, the dilute solution showing a faint opalescence. The greater part of the oil distilled over between 251° and 253° and proved to be methyl eugenol, which is present to the amount of about 97.5 C. The oil also contained traces of eugenol.—Schimmel's Rep., Oct. 1910, 145.

Delft Grass Oil—Yield and Properties.—Schimmel & Co. observe that up to the present nothing was known concerning the oil of delft grass, *Cymbopogan polyneuros*, Stapf, a grass which is characterized by its anise- or fennel-like odor, and the examination of four samples of this oil, published by the Imperial Institute in London, is therefore of interest. The oils were prepared by Jowitt at Bandarawela (Ceylon), and their properties have been determined by Samuel S. Pickles in London. The oil yields ranged from 0.20 to 0.34 per cent. The samples had a yellowish to red-brown color and a peculiar sweetish odor, which, however, was quite distinct from the odor of citronella or lemongrass oil: $d_{15°}$ 0.936 to 0.951; α_D +30° 53′ to 55° 15′. All the four samples were soluble in 1 vol. of 80 per cent. alcohol; upon the addition of 10 vols. the solutions turned opalescent to cloudy. The proportion of acetylizable constituents ("total alcohol") varied from 38.7 to 51.8 per cent., calculated for $C_{10}H_{18}O$, but whether alcoholic compounds really occur in the oils has not been ascertained. No further details of the composition of the oils are given.—Schimmel's Rep., April, 1911, 59; from Bull. Imp. Inst., 1910, 444.

Oil of Dill—Distillate from Fruits Cultivated in the Cape Colony.—Dill fruit, sent to the Imperial Institute in London from Cape Colony, yielded an essential oil which corresponded in every respect with the European distillate: $d_{15°}$ 0.9117, α_D +77° 3′ soluble in 6 to 6.5 vols. of 80 per cent. alcohol. The fruit was derived from plants which had been grown from English seed.—Schimmel's Rep., April, 1911, 59.

Estragon Oil—Properties.—Roure-Bertrand Fils report on a distillate of estragon (tarragon) prepared by themselves, which was distinguished

from the usual commercial oils chiefly by its high specific gravity, but also by its greater solubility. The constants of this oil were as follows: $d_{15°}$ 0.9814, a_D +20° 56′; sap. v., 29.8; sol. in 4 vols. and more 80 per cent. alcohol. It is not clear from their report what is the reason of these unusual values. From the saponification value stated above, they estimate a linalyl acetate content of 10.4 per cent., but they do not state whether this body, which up to the present has not been detected in estragon oil, was actually found present in their sample.— Schimmel's Rep., April, 1911, 72; from Ber. von. Roure-Bertrand Fils, October, 1910, 41.

Eucalyptus Oils—Extensive Use in the Smelting of Ore in Australia.— A business friend of Schimmel & Co. has recently communicated to them a few particulars concerning the extensive use of eucalyptus oil in Australia in the smelting of ores. He says that last year enormous quantities of oil have been consumed in the mining districts in the processes of preparing sulphides of zinc and lead. About one-half pound of oil is emulsified by vigorously shaking it up with about 100 gallons water, and with this mixture the moistened or powdered ore is stirred up. The eucalyptus oil absorbs the sulphide particles and carries them to the surface, together with the gold and silver contained in them, up to 95 per cent. of the actual content of the powdered ore being recovered by the process. The Barrier mines already consume about 10 tons of eucalyptus oil monthly, and this exceptional demand makes the distillers independent of other markets.— Schimmel's Rep., Oct., 1911, 49.

Eucalyptus Oil—Resorcinol-Method of Cineol-Assay.—Commenting on a recent paper of C. E. Sage (Perfum. and Ess. Oil Record, *1* (1910), 194), in which it was shown that the results of cineol determinations in eucalyptus oil when carried out by the phosphoric acid method of the U. S. P. and by the resorcinol method of Schimmel & Co. do not agree, the latter take occasion to point out that their "modified resorcin-method" (see Proceedings 1908, 324), when carried out correctly, gives reliable values, and that the phosphoric acid method is useless. Furthermore, Sage having, in common with other, observed some crystalline deposits (consisting of cineol-resorcinol) in the unabsorbed oil floating on the saturated solution of cineol, Schimmel & Co. draw attention to the fact that these deposits are without practical influence upon the result of the test, which is not vitiated thereby as appears to be suspected.—Schimmel's Rep., Oct. 1910, 69.

Oil of Eugenia Apiculata—Yield and Constants.—According to Tunemann the young leaves of *Eugenia apiculata*, D. C., known in Chili by the local name "Arrayan," depend upon a volatile oil for their reputed value in affections of the lungs and on a tannin-like glucoside in the treatment of diarrhoea. Schimmel & Co. have now distilled a parcel of these leaves, which yielded 1.27 per cent. of a brown oil, having an odor

resembling that of myrtle oil, and giving the following constants: Sp. gr. (15°), 0.8920; opt. rot., + 12° 40′; refract. index, (20°), 1,47821; acid number, 5.5; ester number, 25.8; ester number after acetylation, 65.3; soluble in 0.5 vol. and more of 90 per cent. alcohol, separating paraffin on further dilution; not soluble in 10 vols. of 80 per cent. alcohol.—Schimmel's Rep., Oct., 1910, 145.

Oil of Gastrochilus Pandurata, Ridle—Constants.—A sample of oil distilled from *Gastrochilus pandurata*, Ridle, received by Schimmel & Co., from Dr. A. J. Ultée, of Salatiga, Java, was found to have the following properties and constants: Almost colorless; odor strongly resembling estragon and basilicum oils; sp. gr. (15°), 0.8746; opt. rot. + 10°24′; refrac. index (20°), 1.48957; acid number, 0; ester number, 17.3; imperfectly soluble in 10 vols. 80 per cent., but mixing clear with 90 per cent. alcohol.—Schimmel's Rep., Oct., 1910, 148.

Oil of Gaultheria—Comparison of Distillates from the Leaves and from the Whole Plant.— From 407 Gm. of the entire plant of *Gaultheria procumbeus*, L., collected during early June near Hammonton, N. J., and carefully freed from dirt and garbled to remove foreign plants or parts of such, George M. Beringer obtained by steam distillation 23.63 (=0.586 per cent.) of volatile oil, which resembled both in color and odor the distilled oil commonly appearing in commerce. About the same time, Professor Henry Kraemer had distilled a quantity of oil from gaultheria, using leaves only which were separated from freshly-collected plants. Having secured a sample of Kraemer's distillate, the author was thus enabled to compare two authentic samples of oil of gaultheria, which exhibited some distinct differences. The sample from Kraemer's distillation is almost water-white, and has remained so for a year. It has also a much lighter, more ethereal, odor than Mr. Beringer's oil, which has a much heavier odor, and gradually darkened, assuming a pale amber tint. The specific gravity of Kraemer's oil was 1.785, the optical rotation —0.26°, while in Beringer's oil these constants were 1.177 and —1.335°, respectively. While there is therefore scarcely any difference in the specific gravities of the two oils, the optical rotation of Beringer's oil exceeds the limit of the U. S. P., namely, "lævogyrate up to —1° in a 100-Mm. tube, at 25° C." While the U. S. P. describes oil of gaultheria as "distilled from the leaves" it is believed to be the practice to distill the entire over-ground portions of the plant—and if this is officially recognized, the limitation of optical rotation must be somewhat extended. — Amer. Journ. Pharm., Sept., 1910, 437–438; Proceedings New Jersey Pharm. Assoc., June, 1910.

Nilgiri Gaultheria Oil—Botanical Source and Characters.—Werner Reinhart communicates a short account of the properties of wintergreen oil in India from *Gaultheria fragrantissima*, Wall (*G. fragrans*, D. Don.;

G. punctata, Blume; *Arbutus laurifolia*, Buch.-Harn.), a little-known plant which occurs gregariously over extensive tracts of the higher Nilgiri region, and is also frequently met with in the Palni and Travancore Hills. It differs markedly in its habit from *G. procumbus*, L., the parent-plant of the American wintergreen oil, which is a small, creeping shrub, while *G. fragrantissima* grows into a strong high bush. The oil is prepared by the natives in the neighborhood of Ootacamund by simple distillation of the leaves with water in primitive copper stills, the oil yield being very small, and the distilling therefore unprofitable. A sample of this Nilgiri wintergreen oil accompanying Mr. Reinhart's communication was examined by Schimmel & Co. While it resembled the oil from *G. procumbens*, both in odor and its other properties, it was inactive, whereas the latter is faintly lævorotatory. The following constants were obtained: $d_{15°}$, 1.1877; a_D +0°; $n_{D20°}$, 1.53485; ester val., 364.8=99 per cent. methyl salicylate; soluble in 7 vols. and more of 70 per cent. alcohol. The oil had a reddish-brown color.—Schimmel's Rep., Oct., 1911, 96–97.

Oil of Gaultheria—Tests of Distinction from Oil of Betula and Methyl Salicylate.—I. V. Stanley Stanislaus and Paul Semmel briefly describe a number of tests by which it appears to be possible to distinguish oil of gaultheria from the oil of betula and from methyl salicylate. The presentation of the subject in this paper is such that it cannot be profitably condensed and it must therefore be consulted in the original, in Proc. Pa. Pharm. Assoc., 1911, 245–247.

Geranium Oil—New Alcoholic Constituents.—In addition to the constituents of geranium oil discovered by them some years ago (see Proceedings 1904, 865), Schimmel & Co. have succeeded in proving the presence of some more alcoholic bodies in this oil. Although they have found it impossible to separate out *a-terpineol* in the solid form, the presence of this alcohol was proved without a doubt. The fraction containing *a-terpineol* likewise contained *phenylethyl alcohol*, an important constituent of rose oil, which was isolated and its identity established by its odor and physical constants. *Citronellol* formed the principal part of the fraction examined, which in addition contained traces of *menthol* and small proportions of an alcohol possessing a peculiar odor reminding somewhat of *borneol*. Repeated attempts to find a *terpineol*, the presence of which was suspected, failed in their object.—Schimmel's Rep., Oct., 1910, 69.

Gurjun Balsam Oil—Chemical Examination.—E. Deussen and H. Philipp have subjected gurjun-balsam oil, received from Schimmel & Co., to chemical examination. The yellow oil had a green fluorescence and gave the following constants: Sp. gr. at 15°, 0.922; opt. rot. at 17°, —44°25′. The oil (obtained from the balsam by distillation and ether-extraction) consisted exclusively of sesquiterpenes. Experiments to

obtain solid addition products with HCl and NOCl resulted in the negative; but by oxidation of the oil with potassium permanganate a well-defined oxidation product was obtained, which the authors are inclined to consider available for the recognition of gurjun-balsam in copaiba. Further experiments are now in progress.—Pharm. Ztg., lv (1910), No. 84, 848; from Chem. Ztg., 1910, No. 104.

Gurjun Balsam Oil—Constituents.—It has long been known that the volatile oil of gurjun balsam consists almost wholly of a sesquiterpene, for which the name "gurjunene" has been suggested. Deussen and Philipp, in continuation of previous experiments, have succeeded in separating this sesquiterpene into two fractions, having different boiling points and other physical constants. The lower boiling fraction, which they have named

α-Gurjunene, boils at 119° (12 Mm.) and is strongly laevorotatory, while determination of the mol. refraction showed it to be tricyclical. The hydrocarbon of the higher boiling point has been named

β-Gurjunene. This boils at 122.5° to 123.5° (12 Mm.), and is slightly dextrorotatory and bicyclical. Both hydrocarbons, by oxidation with potassium permanganate in acetone solution, yield a ketone (?) $C_{15}H_{24}O$ which, when regenerated from its semicarbazone (m. p. 234°) possesses the following constants: b. p. 175° to 178° (12 Mm.); sp. gr., 1.0160; opt. rot., + 120° to 130°; refr. index, 1.5303; b. p. of oxime, 204° (12 Mm.). A bicyclical hydrocarbon, to which the authors give the name

Isogurjunene is produced when rectified gurjun balsam oil (i. e., a mixture of *α*- and *β*-gurjunene) is saturated in ethereal solution with hydrochloric acid gas, and the mixture allowed to stand two days at room temperature. Isogurjunene has the b. p. 129.5° to 132° (12 Mm.); sp. gr., 0.9183; refract. index, 1.5057.—Schimmel's Rep., Oct., 1910, 71; from Liebig's Annalen, *374* (1910), 105; Chem. Ztg., *35* (1910), 921.

Dalmatian Oil of Helichrysum Angustifolium.—Properties.—Schimmel & Co. mention that a sample of oil from *Helichrysum angustifolium*, D. C. (*H. italicum*, G. Don.), obtained from Dalmatia, gave the following constants: $d_{15°}$ 0.9005; $n_{D20°}$ 1.48209; acid v., 0.9; ester v., 61.; sol. in about 9 vols. and more 90 per cent. alcohol. The color of the oil was olive-green; its odor reminded somewhat of Roman chamomile; its opt. rot. could not be determined because of its intense color. The present sample differs from oils of the same derivation previously described by its ester value, which is decidedly lower.—Schimmel's Rep., Oct., 1911, 54.

Oil of Inula Viscosa—Properties.—From *Inula viscosa*, Ait. (*Cupularia viscosa*, Gren. et Godr.; *Pulicaria viscosa*, Koch), which they obtained from Algeria, Roure-Bertrand Fils have distilled a pale brown oil, with an odor both of hyssop and of eucalyptus oils. The oil gave the fol-

lowing constants: $d_{15°}$ 0.9436; a —24° 0′; sol. in 1 vol. and more 80 per cent. alcohol, with separation of paraffin. With 10 vols. 70 per cent. alcohol the solution remained slightly turbid. About 70 per cent. of the oil were absorbed by a 50 per cent. resorcinol solution; hence the principal constituent of the oil appears to be cineol.—Rep. Roure-Bertrand Fils, April, 1911, *23*.

Commenting on the above, Schimmel & Co. mention that some years ago, when engaged in distilling the same plant (which they described as *Inula viscosa*, Desfontaines), they obtained an oil with quite different properties. It was viscous, of a dark brown color, and even at ordinary temperatures paraffin was separated out from it. The sp. gr. at 25° was 1.006.—Schimmel's Rep., Oct., 1911, 55.

Oil of Jasmine Flowers—New Constituents.—In addition to the constituents of oil of jasmine flowers identified by Hesse, two new constituents—*p-cresol* and *geraniol*—are now shown to be present by F. Elze. The *p*-cresol was extracted by shaking the oil with 2 per cent. caustic soda solution, and separating the phenol from this solution by saturating with carbon dioxide; it had the odor of cresol, and gave a brownish-green color with ferric chloride in alcoholic solution; it was identified by conversion into the characteristic *p*-cresol methyl ether, and oxidation of this to anisic acid. After removal of the cresol the oil was fractionally distilled *in vacuo*, and the fraction distilling from 75° to 120° C. was treated with phthalic anhydride and benzol in the usual way; the alcohols obtained were mixed with calcium chloride and set aside until a solid was formed, and this was powdered and extracted with low-boiling petroleum ether. The residue undissolved was decomposed with water, and the product fractionated *in vacuo*, and the fractions treated with diphenylcarbaminic chloride and pyridine; the urethane obtained was recrystallized repeatedly from methyl alcohol and decomposed, when pure geraniol was obtained.—Pharm. Journ. and Pharmacist, Oct. 22, 1910, 492; from Chem. Ztg., Aug. 27, 1910, 912.

Juniperberry Oil—Constituents.—In continuation of their investigation of the constituents of juniperberry oil, Schimmel & Co. give some further particulars concerning the terpene fractions of the oil. They were unable to identify β-pinene in any of the fractions, but in one of them succeeded in proving the presence of *camphene*. The fraction in question boiled at 161° C., and had the following constants: Sp. gr. at 15°, 0.8697; opt. rotation, +2° 32′. The *iso*borneol, prepared from this by reduction according to Bertram and Walbaum's method, melted in spite of repeated crystallization from light petroleum, only at 205° to 206° C; but close examination showed it to be a mixture of borneol and *iso*borneol, which are apparently formed in equal proportion. In this connection Schimmel & Co. mention that they have on repeated occasions experienced similar re-

sults with the camphenes of the oils of lemon, cypress, and myrtle, while, on the other hand, the hydration of the camphene from citronella oil and kesso oil readily yielded *iso*bornel melting at 211° to 212° C. This points to a possible difference in the camphenes from different oils.—Schimmel's Rep., Oct., 1910, 72.

Karambusi Oil—Characters and Composition.—By steam distillation W. Lenz has obtained from the bark of the "karambusi tree" (*Warburgia Stuhlmanni*, Engl.) 0.6 per cent. of a viscous, yellowish-red oil, with a green fluorescence in incident light, and an odor resembling that of sandalwood oil. The examination of this oil resulted as follows $d_{20°}$ 0.9864; $a_{D20°}$ —41.2°, $n_{D20°}$ 1.51269, sap. v. 11.2, ester v. after acet. 111.5, miscible with absolute alcohol; making a clear solution with its own weight of 90 per cent. alcohol, turbidity ensuing upon the addition of more alcohol. The oil boiled between 100° and 202° C., at 24 mm. press. With sodium bisulphite an aldehydic constituent was obtained from the oil, but no details of this body are given. Lenz also discovered in the oil small proportions of sulphur compounds. He describes the oil as an adulterant of East-African sandalwood oil.

Commenting on the above, Schimmel & Co. observe that the product which is occasionally brought to Europe under the name of "African Sandalwood Oil" is quite different from the East Indian oil, and is of no importance so far as European trade is concerned. Karambusi oil, therefore, can at most be regarded as an adulterant of local importance, but they are inclined to doubt altogether whether sandalwood oil is distilled in East Africa to any extent. An oil which they distilled from East African sandalwood some years ago, and of which the constants correspond with those of Lenz's oil, was derived from a species of *Osyris* and was quite different from East Indian sandalwood oil.—Schimmel's Rep., April, 1911, 77; from Ber. d. Deutsch. Pharm. Ges., *20* (1910), 351.

French Lavender Oil—Two New Constituents.—F. Elze has isolated two new constituents—*thymol* and *nerol*—from a fraction of French lavender oil boiling between 85° and 100° C. (5 mm.), having the sp. gr. at 15°, 0.916; a_D, —3°; sap. value, 216 (= 75.6 per cent. linalyl acetate). The original oil had the sp. gr. at 15°, 0.889; a_D, —6° 20′; sap. value, 99 (= 34.65 per cent. linalyl acetate—not 36.6 per cent. as stated by the author. The *thymol* was isolated in the usual manner with soda liquor; it melted at 50° to 51° C. (m. p. of the phenyl methane, 107°–107.5° C.; of the nitroso derivative, 160° to 160.5° C.) In those fractions of the oil previously tested with soda liquor which reacted with phthalic anhydride, *nerol* was found to be present: Sp. gr. 15°, 0.880; a_D, + 0°; m. p. of the tetrabromide, 118° to 118.5° C.; m. p. of the diphenyl methane, 50° C.

Commenting on these findings, Schimmel & Co. observe that only an examination of unquestionably genuine material may be able to decide

the question whether thymol is really a normal constituent of lavender oil or whether, perhaps, it had become incorporated by some mischance in the oil examined by Elze.—Schimmel's Rep., April, 1911, 78; from Chem. Ztg., *34* (1910), 1029.

Oil of Lemon—Estimation of Citral.—Mentioning various objections to the present official method for estimating the citral in oil of lemon, depending on the use of sodium sulphite, J. R. Rippetoe and Louis E. Wise recommend that the colorimetric method recently proposed by Hiltner (1909) and depending on the reddish-yellow color produced by a solution of metaphenylenediamine hydrochloride when added to an alcoholic solution of the lemon oil, be further studied, and, if possible, substituted for the pharmacopœial sulphite method. The authors give some comparative figures, showing Hiltner's method to be the more accurate of the two and far less troublesome. Since it does not determine the citronellal, and thus eliminates a positive error inherent to the sulphite method, the results may naturally be somewhat lower, and if the method is adopted it may be necessary to change the U. S. P. requirement from 4 per cent. to approximately 3.8 per cent. of citral.—Amer. Journ. Pharm., Dec., 1911, 558–562.

Lemongrass Oil—Native Method of Distillation in Southern India.—Schimmel & Co. quote from a paper by Mr. Werner Reinhart some interesting information concerning the production of lemongrass oil by the native methods employed in the southern part of British India, from which it appears that lemongrass (*Cymbopogon flexuosus*, Stapf) occurs both in the wild state and as a cultivated plant on the western littoral of Southern India from Cape Comorin northwards to Malabar. The distillation of the oil begins shortly after the commencement of the rainy season, that is to say about the beginning of July, and continues according to the course of the monsoon, which follows the southwest monsoon, until early in January. Mr. Reinhart describes a native distilling plant on the Periyar River in the district of Travancore, which is one of the most important districts for the production of the oil. Under a straw-covered roof resting on bamboo poles, a copper still about 6 feet high and 3 feet in diameter is erected upon a hearth built of stones about 1 foot high. There are no special arrangements for carrying off the smoke, the air having access to the fire from all sides. About midway at the side of the still is an opening which can be closed by a cover, through which the grass—about 1000 bundles weighing in the aggregate some 700 pounds—together with about 40 gallons of water are introduced, and taken out again after the distillation. The top of the still is surmounted by a helm, from which a copper rising tube leads into the condensing worm, which is placed in a wooden vat about 6 feet high, into which water flows from a well through a wooden gutter. The receiver is a shallow but very wide cylinder without cover—

the width of this cylinder supplying a large surface, on which the oil accumulates, and from which it is occasionally removed with a spoon, while the water which distils over is allowed to run to waste through a tube projecting upward from near the bottom of the vessel at an acute angle. The lutings are effected with "cow dung." The distillation of a charge requires about 5 or 6 hours; the yield of oil is from 22 to 33 ounces.—Schimmel's Rep., Oct., 1910, 77.

Lemongrass Oils—Cause of Difference in Solubility.—Several years ago Stapf pointed out that the differences in the degree of solubility in alcohol of lemongrass oils bears some relation to the differences of the raw material from which the oil has been distilled; the readily-soluble East India (*i. e.* Malabar, Cochin or Travancore) lemongrass oil being derived from *Cymbopogon flexuosus*, Stapf, and the so-called West Indian lemongrass oil, which is distinguished by its slight solubility, from *C. citratus*, Stapf.

Experiments in the cultivation of these two species of lemongrass made by J. F. Jowitt at Bandarawela (Ceylon) have confirmed Stapf's theory. The oils prepared by Jowitt from the cultivated grasses have been examined by Samuel S. Pickles at the Imperial Institute in London and the botanical origin of the corresponding raw material has again been carefully tested by Stapf. It was found that the oils of *C. citratus* gave no clear solution even with 10 vols of 90 per cent. alcohol, while *C. flexuosus* yielded an oil which was soluble in 2.2 vols. and more of 70 per cent. alcohol. The oil yield of the first-named grass was from 0.22 to 0.37 per cent., of the second 0.31 per cent. and the properties of the oils were as follows:

Parent Plant	$d_{15°}$	α_D	Citral Content (Bisulphite Method)
C. citratus.....	0.892	—0°25′	75 per cent.
"	0.891	—0°39′	74 per cent.
"	0.893	+1° 7′	76 per cent.
C. flexuosus.....	0.916	+0°35′	67.5 per cent.

The exceptionally high sp. gr. of the oil from *C. flexuosus* is remarkable, for as a rule this value does not exceed 0.905 in lemongrass oil. Perhaps the fact that the distilling material was not quite uniform has some bearing on the matter, for according to the statement published by the Imperial Institute it is not impossible that the grass of *C. flexuosus* was mixed in this particular case with a little Mana-grass.—Schimmel's Rep., April, 1911, 79; from Bull. Imp. Inst., *8* (1910), 144.

Fiji "Lemon-grass" Oil—Source and Properties.—According to a com-

munication in "Perf. and Ess. Oil Record" (*1* (1911), 232) an oil with an odor resembling that of a mixture of lemon-grass oil and Java citronella oil has been obtained in the Fiji-Islands by distillation of *Cymbopogon coloratus*. The sp. gr. of this oil was 0,920 and it contained 42 per cent. of constituents which reacted with bisulphite, as well as 15 per cent. geraniol. The oil, of which the percentage yield is not indicated, made no clear solution with 70 per cent. alcohol. In the Fiji-Islands this oil is known as "lemon-grass oil."—Schimmel's Rep., April, 1911, 58.

Linaloe Oil—A Product from Formosa.—According to a recent report by the German Consul at Nagasaki, linaloe oil has recently been manufactured in Formosa, and the Camphor Monopoly Bureau in that island intends to undertake the sale of it. Schimmel & Co., who have examined samples of this oil, pronounce it as thoroughly capable of competing in the market. but further particulars must be awaited.—Schimmel's Rep., Oct., 1910, 79.

"*Huile de Bois de Rose Femelle*" (Cayenne Linaloe Oil).—*Botanical Scource of Material.*—Schimmel & Co. observe that the question from what plants Cayenne linaloe oil ("Huile de Bois de Rose femelle") is distilled, has not yet been definitely solved. Hence special interest attaches to an article by E. M. Holmes (Perfum. and Ess. Oil Rec., *1* (1910), 32) in which the author gives a short synopsis of the publications which have thus far appeared on the subject. He comes to the conclusion that "Bois de Rose femelle" is not, as stated by Möller, derived from *Ocotea caudata*, but from *Protium* (*Icica*) *altissimum*, March. In Cayenne the wood of *Ocotea caudata* (*Licaria guianensis*, according to Aublet's "Plantes de la Guiane Française, p. 313) is known as "Bois de Rose mâle." The natives call the young trees "Licari Kanali," but they regard the older specimens as a different variety, calling them *Sassafras*. An article on

Mexican Linaloe Woods by Mr. Holmes (Ibid., p. 57), also gives a synopsis of our present knowledge of the parent plants, the distribution, and the character of these woods. According to the author there occur in Mexico, in addition to *Bursera Delpechiana*, Poiss. and *Bursera Aloexylon*, Engl., which yield linaloe oil, a whole series of *Bursera* species, including several possessing aromatic properties, as, for instance, *Bursera penicillata*, Engl., and *B. fagaroides*, Engl. var. *ventricosa*—the latter having an odor of caraway.

Speaking of the trade in Mexican linaloe oil, Schimmel & Co. call attention to the fact that, while formerly Cayenne linaloe oil was only imported in moderate quantities, the shipments have now reached such importance as to bid fair to become a dangerous competitor of the Mexican product. Moreover, the Mexican oil is very far below the Cayenne oil in strength and fineness of perfume.—Schimmel's Rep., Oct., 1910, 79–80.

Oil of Litsea Odorifera—A New Distillate from Java.—Van Romburgh describes a new volatile oil, which is distilled at Buitenzorg from *Litsea odorifera* and used there for medicinal purposes. The oil is of a yellowish color, and of nondescript odor. Its specific gravity is from 0.836 to 0.846, and its optical rotation —3° 30′ to —5°. The principal portion distils, at ordinary pressure, below 233° C. The oil shows no aldehyde reaction, but contains a ketone which forms a solid crystalline compound with sodium bisulphite, and a crystalline semicarbazone. The portion which does not react with sodium bisulphite forms a crystalline phenyl urethane with phenyl isocyanate. An analysis of the fraction distilling under 233° C. points to the presence of a mixture of bodies of the formula $C_{11}H_{20}O$, $C_{11}H_{22}O$, and $C_{11}H_{24}O$. The ketone was separated from the alcohol by preparing the semicarbazone, melting at 116° C., and decomposing this with sulphuric acid. It has the formula $C_{12}H_{22}O$, and appears to be identical with the methyl-*n*-nonyl ketone (undecanone), which is the principal constituent of the essential oil of *Ruta graveolens*.—Chem. & Drug., Nov. 25, 1911, 67.

Oil of Meriandra Benghalensis—Properties.—Two samples of oil described as "sage oils," received from the Italian colony of Eritea by Schimmel & Co., were so clearly different from true sage oils, that they requested and received a sample of the distilling material. Submitting this raw material to a botanical examination, Dr. Giessler ascertained that the plant from which the oil was distilled does not belong to the genus *Salvia* at all, but is, in fact, *Meriandra benghalensis*, Benth.; N. O. Labiatæ (recently re-named *M. dianthera*, Briq.), the leaves of which are used as a popular remedy, for similar purposes as those of sage. Upon distilling the raw material it yielded 1.5 per cent. of a pale brown oil, with an odor reminding both of sage and of rosemary. Further examination produced the following results: $d_{15°}$ 0.9513, a_D —20° 5′, $n_{D20°}$ 1.47490, acid v. 3.7, ester v. 14.8, soluble in 2 vols. and more of 70 per cent. alcohol. When placed in a freezing mixture the oil solidified to a butter-like consistency as a result of the separation of camphor. The two oils received from Eritea showed the following constants: 1. $d_{15°}$ 0.9464, a_D —0° 30′, $n_{D20°}$ 1.47176, acid v. 1.0, ester v. 11.8, sol. in 2 vols. a. m. 70 per cent. alcohol.

2. $d_{15°}$ 0.9526, a_D —1°, $n_{D20°}$ 1.47548, acid v. 5.6, ester v. 9.3, sol. in 1.8 vols. a. m. 70 per cent. alcohol.—Schimmel's Rep., Oct. 1911, 107.

Oil of Monarda Citriodora—Constants and Components.—Clarence Le Fefebvre has distilled the oil of *Monarda citriodora* from crude material (supplied by Mr. Eberle, of Dallas, Texas) in the laboratory of Prof. Edw. Kremers in 1904 and in 1907, and now records his memoranda of their examination. The 1904 oil was red and transparent; sp. gr. 0.9603 at 15° C. and contained 72 per cent. of phenols. The 1907 oil

was so dark red that it ceased to be transparent except in strong light; sp. gr. 0.9548 at 15° C.; phenolic constituent, 78 to 80 per cent. This oil yielded about 4 per cent. of its volume to a saturated solution of sodium sulphite, but the volume of the 1904 oil was not appreciably reduced.

The phenol and non-phenol portions of the oil distilled in 1907 were examined by Nellie Wakeman in the same laboratory, who determined the presence of about 17 per cent. of alcohols in the non-phenol portion (= about 4 per cent. of the total oil) and 11 per cent. of aldehydes (= about 2.75 per cent. of the total oil. The pleasant odor, which characterized the non-phenol portion of the oil (colorless; sp. gr. 0.9899), was almost entirely removed by the removal of the aldehydes with sodium sulphite. The phenol portion of the oil, which was dark red in color, was tested for hydroxythymoquinones. No reaction was obtained for dihydroxythymoquinone, but the presence of monohydroxythymoquinone was indicated by the purple-red color produced with lead acetate. By fractionation, three fractions (232° C., 232°–235° C., and 235°–236° C.), of a pale straw color were obtained, leaving a very small dark-brown residue. The fractions were exposed to a temperature of —10° C., but no part solidified. Evidently there is little or no thymol in the phenol portion of this oil, which it was thought might contain thymol along with the carvacrol.—Midl. Drug. and Pharm. Rev., Oct., 1910, 526–527.

Volatile Oil of Mustard.—Abnormal Distillate from Indian Seed.—In the course of a recent distillation of a parcel of India mustard seed, Schimmel & Co. found the oil which was obtained to behave altogether abnormally and to differ materially from the ordinary allyl mustard oil, both in its physical constants and in having a less penetrating odor. This is the more remarkable, since the seed when examined by Dr. Giessler, Curator of the Botanical Institute of the University of Leipzig, pronounced it to be without a doubt the seed of *Brassica juncea*, Hook, fils et Thoms, the plant which, according to the general belief, yields the ordinary commercial seed. For the purposes of ready comparison the physical constants of this abnormal oil are here given side by side with those of ordinary allyl mustard oil of normal quality:—

	Abnormal Oil	Normal Oil
Specific gravity...	0.9950	1.014 to 1.025
Opt. rotation.....	+ 0°12′	inactive
Refract. Index....	1.51849	1.527 to 1.528
Solubility.....	in 10 vols. 70% alcohol	in 8 vols. 70% alcohol.

Ordinary mustard oil only contains an insignificant proportion of fractions with a boiling point exceeding 155°, but in the case of the abnormal oil the greater part distilled over above that temperature. A thorough chemical investigation, which is described in some detail, showed that the

principal constituent of this oil (about 50 per cent.) is an *isomeric crotonyl mustard oil* of unknown constitution; that it contains only about 40 per cent. of *allyl mustard oil*, and probably as subsidiary constituents, *allyl cyanide* and *dimethyl sulphide*.—Schimmel's Rep., Oct., 1910, 81–85.

Dutch Myrtle Oil—Yield, Characters and Constants.—Laloue has recently examined the volatile oil of the Dutch myrtle (*Myrica Gale*, L.), about which heretofore little was known. The leaves of this plant were formerly official in France under the designation of *Herba Myrti brabantini*, the plant being fairly frequent in marshy localities, both in France and in Germany. The green plant yielded 0.0369 per cent. of a greenish-yellow oil, having an odor reminding of myrtle and showing the following constants: Sp. gr. at 25°, 0.8984; opt. rot., —5° 16′; soluble in one-half its volume of 90 per cent. alcohol, the solution becoming turbid when 5 vols. or more are added; insoluble in 80 per cent. alcohol; acid number, 3.48; ester number, 15.5, and after acetylation, 50.23. When cooled the oil becomes turbid at +5° and congeals at —17° C. A pharmacological investigation of the oil, by Chevalier, shows it to possess pronounced toxic properties; hence the employment of the leaves as an emmenagogue and abortive (for which purpose it is used in Western France), is not without danger.—Schimmel's Rep., Oct., 1910, 42; from Rep. of Roure-Bertrand Fils (April, 1910) and Bull. d. Scienc. pharmacol, *68* (1910), 738.

Niaouli Oil—Use for Injection in Tuberculous Ulcers.—Rallier du Batay recommends the oil from the leaves of *Melaleuca viridiflora*, known as niaouli oil, as a substitute for iodoform-ether and naphthol-camphor for injection in tuberculous ulcers, on the ground that its administration is less painful and attended by less danger than that of the other two remedies named. At first the dose is from 5 to 10 minims, but it is rapidly increased. At the commencement of the treatment a somewhat severe reaction is experienced, but the tuberculous ulcer is rapidly reduced and when the treatment is continued the pus-cavity is healed and cicatrizes.—Schimmel's Rep., Oct., 1911, 62; from "Der Kinderarzt," *22* (1911), 149.

Niaouli Oil—Use as a Vermifuge in French Guiana.—Brimont has obtained excellent results with niaouli oil (from *Cajuputa viridiflora?* Rep.) in the treatment of worms, a very common complaint among the convicts in French Guiana. He prescribes it as follows: Ol. niaouli, 4.0; chloroformi, 3.0; ol. ricini, 40.0. Niaouli oil is also recommended, by G. Houdard, as an addition to tincture of iodine, such a mixture having the advantage over the tincture by itself in causing fresh wounds to cicatrize and to act as a powerful bactericide.—Schimmel's Rep., April, 1911, 83; from "Presse médicale," 1910, 800.

Oil of Ocimum Sanctum, L.—Examination of a Philippine Distillate.—Bacon has obtained from the leaves of *Ocimum sanctum*, L., grown in

Philippine gardens and distilled 48 hours after gathering, 0.6 per cent. of a green oil, having a sweet odor reminding of anise, and giving the following constants: Sp. gr. $\frac{30°}{30°}$, 0.952; a_D, +0; $n_{D30°}$, 1.5079; sap. val., 2.8. A fraction, boiling at 85° to 95° (9 Mm.), contained appreciable proportions of methyl chavicol.—Schimmel's Rep., April, 1911, 83.

Oil of Ocimum Viride—A Distillate from a West African Species.—Schimmel & Co. have examined an oil received from the Imperial Institute in London, which had been obtained from *Ocimum viride*, Willd, a native of tropical West Africa. This oil had a thyme-like odor, was of a brown color, and had the following physical constants: $d_{15°}$ 0.9338, a_D – 0°, $n_{D20°}$ 1.50418. It was soluble in 4 vols. 70 per cent. alcohol, the dilute solution turning opalescent. Treatment with 5 per cent. alkali liquor gave a phenol-content of 52 per cent., the phenol being identical with thymol.—Schimmel's Rep., Oct., 1911, 162.

Onion Oil—Constituents.—As is known, onion oil (from *Allium Cepa* L.), in common with the volatile oils of other species of *Allium*, contains sulphur compounds. W. D. Kooper has recently determined the presence of sulpho-cyanic acid, which he identified by Colasantis' test (treatment of the highly diluted solution with 20 per cent. *a*-naphthol solution and then with twice its volume of conc. H_2SO_4, whereupon an emerald-green ring is formed at the planes of contact), and also allylsulphocyanide, identified by various methods. No formaldehyde, acetaldehyde, or acrolein could be detected in the oil.—Schimmel's Rep., Oct., 1910, 89; from Ztschr. Unters. d. Nahr. u. Genusm. *19* (1910), 569.

Mandarin-Orange Oil—Characters of a Product from Unripe Fruits.—Schimmel & Co. having received a sample of oil from the Province of Valencia in Spain, which was pressed from green unripe mandarin oranges (*mandarinettes*), give the following brief description, which is interesting because a description of oil from this material has heretofore been unknown. The deep olive-green oil had a pleasant aroma, less delicate, however, than that of oil pressed from ripe mandarins. Its constants also deviated somewhat from that of the latter: $d_{15°}$ 0.8665; $n_{D20°}$ 1.47900; acid v., 0.2; ester v., 17.3; evaporation residue, 8 per cent. Owing to the dark color it was impossible to read the rotation of the original oil; the angle of rotation of the initial 10 per cent. of the distillate was a_D + 55° 12′. The oil was not completely soluble in 90 per cent. alcohol, but it made a clear solution with one-half its own vol. of 95 per cent. alcohol. For the purpose of comparison, the characteristics of mandarin-orange oil pressed from ripe fruit, as observed by Schimmel & Co., are given here, as follows: Sp. gr. at 15°, 0.854 to 0.859; optical rotation, a_D – 65° to 75°; a_D of the initial 10 per cent. of the distillate a little lower, or up to about 2° higher, than a_D of the original sample; $n_{D20°}$ 1.475 to 1.478; acid v. up to 1.7; ester v. 5 to 10; evaporation residue, 2.4 to 3.5 per cent.—Schimmel's Rep., Oct., 1911, 46.

Cretan Oil of Origanum—Properties of an Authentic Distillate.—In view of the present imperfect knowledge of the botanical derivation of Cretan origanum oil, of which it is positive only that it is prepared from several species of origanum growing in the Mediterranean countries, Schimmel & Co. have taken advantage of the opportunity to cause the determination of the botanical origin of a parcel of flowering herb received from Smyrna and to determine the characters of the volatile oil distilled from this material. The Curator of the Botanical Institute of Leipzig, Dr. Giessler, has determined the parent plant of this parcel to be *Majorana onites* (L.), Benth. (*Origanum onites*, L., *Origanum smyrnæum*, L.). The oil, of which a yield of 2 per cent. was obtained, was dark-brown and gave the following constants: $d_{15°}$ 0.9572, a_D — 1° 30′ or, from another sample: —2° 10′, phenol-content 74 per cent., sol. in 2.2 vols. and more of 70 per cent. alcohol. It differed from the usual commercial oils from Smyrna (which are also said to be derived from *Origanum smyrnæum*) in having a much greater phenol content, and in its low linalool content. The detailed examination showed that the phenols consisted almost entirely of carvacrol. At 754 mm. press. they boiled between 235° and 237° C., at 5 mm. press. between 95° and 96° C. The nitroso compound melted at 153° C. In contradistinction to what has been observed in the other oils from Smyrna, the non-phenols of this distillate only had a faint linalool odor, and when subjected to fractional distillation at 4 mm. press. they behaved as follows:

1	37 to 42°	17 per cent.	a_D — 1° 56′
2	42 " 45°	25 "	+ 1° 50′
3	45 " 72°	11 "	+ 1° 30′
4	72 " 80°	5 "	— 5° 40′
5	80 " 105°	15 "	—11° 28′
6	105 " 120°	7 "	—25° 45′
7	Residue	20 "	—

Fraction 1 consisted principally of *a*-pinene (benzyl nitrolamine, m. p. 123.5° C.), but the two following fractions consisted almost entirely of p-cymene, which was identified by conversion into p-hydroxy*iso*propyl benzoic acid, m. p. 155° C. The fourth fraction, after repeated fractionation, was found to contain l-linalool. The phenylurethane, which was formed from phenyl *iso*cyanate, was lævorotatory (as was the linalool fraction itself), its m. p. being 63° to 64° C. Its m. p. was not depressed with a preparation from pure linalool used for purposes of comparison. The fifth fraction was solid at ordinary temperature owing to camphor having separated out. This camphor was dextrorotatory and, after purification, gave m. p. 176° to 177° C. Its oxime rotated in the opposite direction and melted at 120° C. The fraction with the higher b. p. contained probably one or more sesquiterpenes, but as to this nothing could be ascertained with certainty. Among the constituents of the oil, there-

fore, *a*-pinene, *p*-cymene, *l*-linalool and *d*-camphor were positively identified by these investigations.—Schimmel's Rep., April, 1911, 84–86.

Oil of Orris—Modern Method of Preparation.—F. Robert declares that the preparation of oil of orris by distillation with steam is a totally unsuitable and antiquated method, requiring much time and trouble, and recommends the replacement of the present method by a process of extraction with a suitable solvent. In lieu of the highly inflammable light petroleum, most frequently used for this purpose, he recommends di- or tri-chlorethylene, which are non-inflammable, although they have the drawback of liberating some hydrochloric acid in the presence of moisture. He says these two solvents are now used in all German work. As soon as the solvent has absorbed a sufficient proportion of soluble constituents from the orris root it is either distilled *in vacuo* or simply evaporated, the residue being then treated with alcohol to remove any wax-like or resinous constituents. The alcoholic extract is either used as such, or the alcohol is distilled off, leaving an extract of orris of a very agreeable odor, from which the volatile oil may be obtained by rectification. The special advantage to the perfumer is the ready method by which he can prepare concentrated extract of orris for his own use without much trouble. Moreover, the residual (extracted) orris powder, which is of a pale color, can be advantageously used for a variety of purposes.—Schimmel's Rep., Oct., 1910, 90–92; from Journ. Parfum. et Savonn., *23* (1910), 65.

Oil of Paolo Amarello—A Distillate from a Brazilian Wood of Unknown Botanical Origin.—Roure-Bertrand Fils have distilled an oil from the wood of unknown botanical origin, but known in Brazil as *Paolo amarello*, the yield being 0.41 per cent. The almost colorless oil had an odor of linaloe oil and possessed the following characteristics: $d_{15°}$ 0.8892, a_D —5° 54′, sap. v. 22.9, ester content, 8 per cent., calculated as linalyl acetate, ester v. after acet., 200.2. It was soluble in 2 vols. and more of 70 per cent. alcohol.

Another oil distilled from Brazilian wood was obtained from the chips of *Turpentine amarillo*, the oil-yield being 0.134 per cent. This oil had an odor reminding of turpentine, a_D +8° 32′, and was soluble in any proportion in 90 per cent. alcohol.—Schimmel's Rep., April, 1911, 88; from Ber. von Roure-Bertrand Fils, October, 1910, 41.

Javanese Patchouli Oil.—Yield, Properties and Constants.—Roure-Bertrand Fils obtained by distillation 0.803 per cent. of oil from Javanese patchouli leaves, having the following properties: Sp. gr. at 15°, 0.9564; opt. rot.,—28°8′; sapon. number, 6.3; ester number after acetylation, 404; soluble in 0.25 vol. and more of 90 per cent. alcohol. The oil had a somewhat paler color and a less persistent odor than that from Penang or Singapore leaves. It turned viscous on cooling, but showed no separation of patchouli-alcohol.—Schimmel's Rep., Oct., 1910, 93; from Rep., of Roure-Bertrand Fils, April, 1910.

Peppermint Oil—Distillates from the Caucasus. J. Maisit reports the results of an examination of peppermint oil distilled in the Caucasus from dried plants of the first and second years' growth of the "black" variety of peppermint—*Mentha-piperita*, Mitcham var. *nigr.* Both oils (which had not been rectified) were yellowish, weak acid in reaction, and had a pleasant odor. They dissolved readily in 97 per cent. alcohol, but with difficulty in 70 per cent. alcohol, and had the following constants:

Oil from 1 year old plants: Sp. gr. at 20°, 0.912; opt. rot.—17°42'; acid value, 0.57; ester menthol, 6.575 per cent.; free menthol, 42.44 per cent.; total menthol, 49. 17 per cent.

Oil from 2 year old plants: Sp. gr. at 20°, 0.913; opt. rot.—17°57'; acid val., 56; ester menthol, 8.745 per cent.; free menthol, 41.33 per cent.; total menthol, 50.07 per cent.

These results show practical identity of the two oils, that of the second year's growth containing decidedly more esterified menthol, but very little more total menthol. The quality of these oils shows a decided improvement over the Russian oils hitherto produced, this being doubtless due to the modern method and apparatus employed in their preparation.—Arch. d. Pharm., *249* (1911), No. 8, 637–640.

Hungarian Peppermint Oil—Yield and Constants.—K. Irk gives the following information respecting a Hungarian peppermint oil: The yield of oil obtained from the plants distilled ranged between 0.862 and 1.4306 per cent. The specific gravity, at 20° C., varied from 0.897 to 0.920; rotation, — 26.51° to— 32.40°; soluble in 2 to 4 of 72 per cent. alcohol; in 1 to 2 of 80 per cent. alcohol; in 0.5 of 90 per cent. alcohol; saponification value, 19.6 to 45.99; ester content, 6.93 to 16.26 per cent.; menthol ester, 5.46 to 12.82 per cent.; saponification value, 173.0 to 199.6; after acetylisation, free menthol, 42.815 to 55.90 per cent.; total menthol, 55.38 to 65.19 per cent.; menthone, 7.38 to 13.21.—Pharm. Zentralh., li (1910), No. 39, 889.

Japanese Oil of Peppermint—Presence of l-limonene.—Y. Murayama has found dementholized Japanese oil of peppermint to contain l-limonene. It was contained in a fraction boiling at 170° to 178° C. in the amount of 3 per cent., and possessed the following constants: sp. gr. 15° C. = 0.8632, opt. rot. = 58°51'. Previously (1894) this hydrocarbon was discovered in American Oil of Peppermint by Power and Kleber.—Schimmel's Rep., Oct., 1910; from Yakugakuzasshi, 1910, 141, through Journ. de Pharm. et Chim. vii, 1 (1910), 549.

Japanese Oil of Peppermint—Presence of a New Ketone.—Making use of its property of forming an addition compound with sodium sulphite, Schimmel & Co. have been able to prove the presence of a new constituent in Japanese oil of peppermint, a ketone, which they designate as Δ^1-*Menthenone*, and which so far had not been found in essential oils.

The ketone is identical with that prepared by Wallach (1908) from 1, 3, 4-trihydroxyterpane by elimination of water, but it differs from the Δ^1-menthenone obtained by Callenbach (1897) by acting with methylene iodide upon sodium acetoacetic ester and introducing the *iso*propyl group. It is true that Rabe and Rahm, and also Merling (1905), had shown that the sequence of reactions followed by Callenbach could not yield a ketone of the constitution of Δ^1-menthenone, but the definite proof of this can only be said to have been given by Wallach's synthesis and by the present investigation of Schimmel & Co. which is described in detail. The crude ketone obtained by the briefly described method possessed the following properties: B. p. 101° to 103° C. (7.5 Mm.); sp. gr. 20°, = 0.9387; opt. rot. = + 0° 30′; index of refract. (20°) = 1.48675. When purified by repeated fractionation the ketone boiled between 235° and 237° C. (752 Mm.); sp. gr. 15° = 0.9382 (20° = 0.9343); opt. rot. = 1° 30′; index of refract. (20°) = 1.48441.—Schimmel's Rep., Oct., 1910, 97–105.

Javanese Oil of Peppermint—Characters and Constants.—Roure-Bertrand Fils have found an oil from *Mentha arvensis* var. *javanica*, produced in Java, to possess the following properties: Sp. gr. 15° 0.9979; opt. rot. = +0° 24′; acid number, 69.8; ester number, 49.7 = 13.8 per cent. esterfied menthyl); ester number after acetylation, 153.3 (= 48.2 per cent. total menthol); soluble in 1.5 vol. and more of 70 per cent. alcohol. When the deep yellow oil was cooled, no menthyl separated out, not even after inoculation with a few menthol crystals. The oil differs considerably from distillates which have been previously examined.—Schimmel's Rep., Oct., 1910, 104 and 106; from Rep. of Roure-Bertrand Fils, April, 1910, 65.

Oil of Perilla Nankinensis—Characters and Constituents.—Schimmel & Co. have recently received a sample of volatile oil from Yokohama, which is the distillate from the leaves of *Perilla nankinensis*, Dene (P. *arguta*, Benth.; *Ocimum crispum*, Thunb.), known in Japan as "Shiso" and used as a vegetable and spice. The oil was mobile, pale yellow, had a peculiar hay-like odor, and gave the following constants: Sp. gr. (15°), 0.9265; opt. rot., —90°; refract. index (20°), 1.49835; soluble in 0.3 vol. and more of 90 per cent. alcohol. It had the peculiarity of reacting both with acid and neutral sodium sulphite, yielding 50 per cent. of an aldehyde by this reaction. The odor of this aldehyde reminded somewhat of cuminic aldehyde, but in its properties it differed completely from this body. So far, attempts to elucidate the chemical constitution of this aldehyde have led to no result.—Schimmel's Rep., Oct., 1910, 146.

Perilla Oil—Characters of Aldehyde Constituent.—The aldehyde from the oil of *Perilla nankinensis*, Deene., having been supplied to Simmler and Zaar by Schimmel & Co. for closer examination, it was found by them

to be a dihydrocuminicaldehyde, having the following constants: b. p. 104° to 105° C. (10 mm.), $d_{18°}$ 0.9617, $[a_D]$ —146°, n_D 1.50746, mol. refr. found 46.40, calc. for $C_{10}H_{14}O$ / 45.52. The semi-carbazone melts between 199° and 200° (from alcohol). By reducing this aldehyde with zinc dust in acetic acid the corresponding perrillic alcohol $C_{10}H_{16}O$ was obtained: b. p. 119° to 121° C. (11 mm.), $d_{20°}$ 0.9640, $[a]$ —68.5°, n_D 1.49964. The ethyl ester boils at 123° to 126° (13 mm.): $d_{20°}$ 0.9785, $[a]_D$ —48°, n_D 1.48142. The chloride of perillic alcohol has the following properties: b. p. 99° to 101° (12 mm.), $d_{20°}$ 0.9861, $[a]_D$ —60°, n_D 1.49728. Reduction of the chloride with sodium and alcohol gave rise to limonene ($[a]_D$ —51.5°; m. p. of the tetrabromide 104° to 105°). When the perillic aldoxime is boiled with acetic anhydride and sodium acetate it yields the nitrite of perillic acid (b. p. 116° to 118° at 11 mm.; $d_{20°}$ 0.9439; $[a]_D$ —115°; n_D 1.49775). The corresponding perillic acid has the following constants: m. p. 130° to 131° (from dilute alcohol) b. p. 164° to 165° (10 mm.), $[a]_D$ —20° in 25 per cent. alcoholic solution, m. p. of the dibromide 166° to 167°.

The foregoing shows that perillic aldehyde has for its basis the atomic skeleton of limonene and that therefore a reducible double bond of the aldehyde group is adjacent to it. As a matter of fact, by treating perillic acid with sodium in an amylic alcohol solution, dihydroperillic acid, $C_{10}H_{16}O_2$, was obtained: m. p. 107° to 109° C., b. p. 152° to 153° C. (10.5 mm.), $[a]_D$ ±0°, m. p. of the dibromide 116° to 117° C. The methyl ester boiled at about 105° to 106° C. (11 mm.); $d_{19°}$ 0.9732, n_D 1.46768. Semmler reduced the ester with sodium and alcohol by the usual method and obtained the dihydroperillic alcohol $C_{10}H_{18}O$: b. p. 113° to 115° C. (10 mm.) $d_{19°}$ 0.9284, $[a]_D$ ± 0°, n_D 1.48181. This alcohol has a pleasant rose-like odor. Schimmel's Rep., April, 1911, 93–94; from Berl. Berichte. *44*, (1911), 52.

Petitgrain Oil—Abnormal Properties of Recent Supplies.—Attention having been called in "Perfumery and Essential Oil Record" (1[1910] 157) to the occurrence on the London market of petitgrain oils differing from the article formerly imported by their lower specific gravity and particularly their lower ester-content, and their greater rotation to the right, Schimmel & Co. confirm this observation of the abnormal characters of the oil as recently found on the market by their own experience. These oils were poorer in ester (in some cases containing only 35 per cent. or less) than the normal oil and, most important of all, they were not equal to the standard as regards odor. Correspondence reveals that the producer ascribes their abnormal behavior, among other things, to the unfavorable weather and a change in the condition of the soil; but Schimmel & Co. are rather inclined to think that the distilling material has been less carefully selected, and that possibly fruit in an advanced state of maturity has been distilled along with the other material. This, they think, would

explain all the abnormalities observed.—Schimmel's Rep., Oct., 1910, 106–107.

Petitgrain Oils—Constants of Different Kinds.—Roure-Bertrand Fils have prepared four different petitgrain oils from the branches of the bitter orange, the sweet orange, the lemon, and the mandarin-tree, and have found these oils to possess the constants given below, which are recorded here as a matter of interest:

	Sweet Orange.	Bittter Orange.	Lemon.	Mandarin.
$d_{15°}$	0.8980	0.8584	0.8806	1.0943
a_D	—4°20′	+ 53°52′	+ 30°44′	+2°20′
Sap. v.	161.4	12.5	43.8	265.0
Ester v. after acet.	203.0	47.4	130.6	—
Solubility	In 3.5 vols. 70% alc.	In 0 5 vols. 90% alc.	In 1 Vol. 85% alc.	In 1 vol. 90% alc.

—Schimmel's Rep., April, 1911, 95; from Ber. vor. Roure-Bertrand Fils, October, 1910, 42.

Oil of Pinus Excelsa—A Distillate from the East Indian Cones.—Schimmel & Co. have received and describe a sample of oil distilled from the cones of *Pinus excelsa*, Wall, a tree known in India as "Indian Blue Pine," while the oil is locally known as "Oil of Pine Cone." The sample sent was too small to enable a complete examination of the chemical composition of the yellow oil, which possessed the following constants: The specific gravity at 15° was 0.8757; a_D —32° 45′; $n_{D20°}$ 1.47352; acid v., ester v., 5.6, corresponding to 2.0 per cent. bornyl acetate. Soluble in 5 vols. and more of 90 per cent. alcohol.—Schimmel's Rep., April, 1911, 124.

Pine Needle Oil from Pinus Pumilio—New Oxygenated Constituents.—E. Böcker and A. Hahn have isolated several new oxygenated bodies from the oil of the needles of *Pinus pumilio*. An oil which had been freed from terpenes and sesquiterpenes (b. p. 85° to 178° C., 13 Mm.), was split into several fractions. The fraction boiling between 148° and 160° C. yielded a liquid of faint balsamic odor, having the elementary formula $C_{15}H_{26}O$, which is probably an *aldehyde*. The fraction boiling between 127° and 148° (13 Mm.) yielded a lævorotatory body, $C_{15}H_{24}O$, which is probably a *ketone*. The third fraction, boiling between 87° and 95° (14 Mm.), yielded a volatile oil possessing the peculiar aroma of pumilio pine-needle oil, to which the authors have given the name

Pumilone. It has the formula $C_8H_{14}O$ and possesses the following

properties: B. p. 216° to 217° (754 Mm.); sp. gr. at 15°, 0.9314; a_D, —15° 0′; n_D, 1.4650. It is a saturated body and is present in the original oil in the amount of about 1 to 2 per cent.—Schimmel's Rep., Oct., 1911, 74; from Journ. f. prakt. Chem., II, *83* (1911), 489.

"Priprioca Oil"—A New Perfume Oil.—E. G. and A. Camus have distilled and examined a new perfume oil from the branches and the wood of a plant known as "Priprioca" in Rio de Janeiro and Guyane, which is botanically *Mespilo daphne pretiosa* (N. O. Lauracea). Two varieties appear to exist, the one having white wood (female "priprioca"), the other having yellow wood (male "priprioca"); but it is only the white-wood variety that contains volatile oil, and the distillation is therefore confined to material from this variety.

Volatile Oil from the Branches was obtained in a yield of 7.9 Gm. from 1600 Gm. of the almost dry material (with adherent leaves). It was pale yellow, had an agreeable odor, reminding of linaloe, and exhibited the following characters:

Sp. gr. at 15°	= 0.8912	Optical rotation	+ 7° 20′
Refractive index at 20°	= 1.4690	Acid-value	1.4
Saponification-value	15.3	Esters	4.65%
Acetyl-ester value	165.2	Linalol	51.8%

The oil is soluble in 1.25 volume of 70 per cent. alcohol.

The White-wood Oil.—Twenty-five kilos. of the wood was distilled, and the oil collected in two portions: (*a*) A light oil, 125 gr.; (*b*) a heavy oil, 48.2 gr. The total yield was 0.693 per cent. of the weight of the wood. The following values give the characters of these two portions, as well as those of the combined essential oil:

—	Light Oil.	Heavy Oil.	Combined Oil.
Sp. gr. at 18°	0.9639	1.0551	0.9808
Rotation	+ 8° 48′	+ 3° 8′	+ 7° 12′
Refractive index	1.501	1.543	1.519
Acid value	0.7	3.5	2.1
Saponification-value	100.8	203.7	128.1
Esters	35.28	—	—
Linalol	66.6	—	—

The light oil has a marked odor of rosewood and linaloe, with a suggestion of cinnamic alcohol. The heavy oil smells much like linaloe oil, with a suggestion of cinnamon. The esters in the heavy oil as indicated by the saponification-value would amount to 71.29 per cent. as linalyl acetate; but as a large portion of these are present as benzoate of linalol, and probably geraniol, the exact amount is uncertain. The authors conclude that this essential oil, which was hitherto unknown in Europe, is one of much

value for perfumery and soap purposes. The oil from the branches and twigs is quite fit to replace linaloe oil, if it can be obtained in sufficient quantity; while the oil from the wood promises to be of very great value and interest, especially as it contains benzoic-acid esters in very large amount.—Chem. and Drug., Dec. 10, 1910, 52.

Oil of Pycnanthemum — Properties and Constituents.—Emerson R. Miller has determined the characters, constants and constituents of the volatile oil obtained by steam distillation from the leaves and flowering tops of *Pycnanthemum pycnanthemoides* in a yield of 0.6 to 0.85 per cent. The oil is slightly yellowish or greenish in color; odor, pleasant camphoraceous; sp. gr. 0.9004 to 0.9015; op. rot., —21.9°; refract. index, 1.46539; sap. val., 6.28: sap. val. after acetylization, 76.7. The oil proved to have a high cineol content. Other constituents are: Levopinene, eugenol, linalool, esters of linalool, geraniol (?), and a sesquiterpene (?).—Proc. Alabama Pharm. Assoc., 1910, 58–59.

Oil of Robinia Pseudo-Acacia—Methylester of Anthranilic Acid a Constituent.—In 1908 Verschaffelt expressed the opinion that the odor of the flowers of *Robinia Pseudo-Acacia* pointed to the presence of the methylester of anthranilic acid, and F. Elze has now demonstrated that this ester is actually contained in these flowers. By extraction with a readily volatile solvent, a very dark colored oil was obtained, having when diluted quite the natural odor of the flowers, and showing the following constants: B. p. = 60° to 150° (5 Mm.); sp. gr. 15° = 1.05; ester content, calculated as methyl anthranilate, 9 per cent.; soluble in alcohol with a clearly perceptible blue fluorescence. The oil also contained heliotropine, together with other aldehydes or ketones. Among other constituents, linalool and terpineol were determined, while nerol is probably also a constituent of the oil.—Schimmel's Rep., Oct., 1910, 107–108; from Chem. Ztg., *34* (1910), 814.

Otto of Rose—A New Adulterant.—Ernest J. Parry observes that although geraniol, with more or less citronellol still forms the staple adulterant of otto of rose, numerous other bodies are being employed at the present time sophisticating this oil. The addition of the abovenamed liquid alcohols has the effect of raising the specific gravity and refractive index, and lowering the melting-point, as well as, to some extent, covering the characteristic sweet odor of the pure otto of rose. Numerous compositions are sold to the peasant-adulterators in oder to rectify these defects, and so enable an adulterated otto to pass a superficial examination, which goes no further than the determination of the physical constants of the sample. Mixtures of phenyl-ethyl alcohol and vanillin, for example, are common; but he has recently succeeded in obtaining from a peasant a sample of an entirely new substance. It is in the form of a colorless liquid of sp. gr. 0.813 at 30°; optically inactive, refractive

index 1.3666 at 20°, and containing suspended crystals of paraffin. It has an odor somewhat recalling orange. It was found, after separating the crystals, to consist of about 95 per cent. of alcohol and 5 per cent. of a liquid of sp. gr. about 0.835, and refractive index at 20° = 1.4226. Its odor suggested that it was either nonyl or decyl aldehyde, both of which bodies are prepared artificially, and probably form adulterants of terpeneless orange oil. An oxime was prepared which melted at 67.5°, or after recrystallization, at 68.5°. The adulterant is doubtless either nonyl or decyl aldehyde; but their physical characters are so similar, and the quantity so small that it was impossible to say which of the two is the actual adulterant.—Chem. & Drug., Oct. 1, 1910, 65.

Rosemary Oil—Characteristic Requirements.—T. Jeancard and C. Satie have published a comprehensive essay on rosemary oil. They base their statements upon their own experiences of the article gathered between the years 1906 and 1910, and arrive at the conclusion that rosemary oil should be required to behave as follows: $d_{D15°}$ 0.900 to 0.920; $a_D \pm 0°$ to $+12°$ C. Total borneol, 9 to 18 per cent.; solubility in 85 per cent. alcohol =0.5 to 1, and in 90 per cent. alcohol =0.1 to 0.5. According to the experience of the authors, not all rosemary oils are soluble in 80 per cent. alcohol. The bornylacetate content varies from 1.7 to 5.1 per cent. The authors also deal at length with the question whether the want of solubility of certain Spanish rosemary oils justifies the conclusion that they have been adulterated with turpentine oil, and whether this point can be determined by analysis, but they do not arrive at any positive conclusion.—Schimmel's Rep., Oct., 1911, 78; from "Amer. Perfumer," *6* (1911), 6; Rev. én. de Chim., *14* (1911), 125.

Dalmatian Rosemary Oil—Constants of Authentic Samples.—Commenting on the current conditions of the rosemary oil market brought about by the prevailing high prices of the French oil and the competition of the cheap Spanish oils, Schimmel & Co. mention that Dalmatian rosemary oil appears to have a slightly lower tendency in view of the restricted demand, and in this connection report that three samples of guaranteed pure rosemary oils distilled in the island of Lissa (Dalmatia) were found to have the following constants.

	$d_{15°}$	a_D	a_D of the first 10%	sap. v.	soluble in
1.	0.8941	+ 0°44′	+ 2°40′	19.3	0.5 to 0.8 vols. a. m. 90% alcohol.
2.	0.8945	+ 0°43′	+ 2°28′	18.5	
3.	0.9003	+ 1°27′	+ 1°14′	not determined	

Samples nos. 1 and 2 in particular gave no clear solutions with 10 vols. 80 per cent. alcohol. This fact, as well as the exceptionally low sp. gr. of these two oils, is perhaps due to their having been distilled in May, at the beginning of the season, from green herb, which made them specially rich in terpenes.—Schimmel's Rep., Oct., 1911, 78.

Algerian Oil of Rue—Source and Characters.—Of the genus *Ruta*, which comprises about fifty species, the following four occur in France, namely: *Ruta montana*, L. (*R. tenuifolia*, Desf.), *R. angustifolia*, Pers. (*R. chalepensis*, L.), *R. bracteosa*, D. C., and the common garden rue, *Ruta graveolens*, L. The same species, with the exception of garden rue, also occur in Algeria. As reported by F. Jadin, these *Ruta* species are easily distinguishable from each other by examination of their anatomic structure, sections of the stalks in particular showing characteristic features. The

Oil of Ruta montana, which is cultivated in Algeria, is usually known as "*essence figeable.*" It contains about 90 per cent. methylnonylketone and solidifies completely at $+10°$: $d_{15°}$ 0.8307; $a_D + 0° 42'$; soluble in 2¼ vols. and more of 70 per cent. alcohol. The properties of the

Oil of Ruta Bracteora, which is also cultivated in Algeria, are totally different. The oil examined by Jadin was obtained from the flowering plant; it contained about 90 per cent. ketones, but did not solidify even at $-15°$: $d_{15°}$ 0.8410; a_D $-40° 12'$; sol. in 2 vols. of 70 per cent. alcohol; when more is added the solution acquires a blue fluorescence, while paraffin is separated out from it. The constants of this oil are almost the same as those of an Algerian oil of rue which was examined by v. Soden and Henle in 1901 (see Proceedings 1902, 987); hence the two products are probably identical. The fluorescence to which reference is made as showing itself when the oil is diluted with alcohol is considered (by Schimmel & Co.) to be perhaps caused by the methyl ester of methylanthranilic acid.—Schimmel's Rep., Oct., 1911, 79; from Ber. von Roure-Bertrand Fils, April, 1911, 11.

Cyprus Oil of Sage—Character and Constants.—Schimmel & Co. report the character and constants of a sample of sage oil distilled in Cyprus which was recently received from the Imperial Institute in London. The oil was pale yellow, with a peculiar odor, differing somewhat from the normal, and exhibited the following constants; sp. gr. (15°) = 0.9263: opt. rot. = $-6° 15'$; refract. index (20°) = 1.46664; acid number, 0; ester number after acetylation, 36.0; soluble with opalescence in its own vol. of 80 per cent. alcohol; forms a clear solution with a small quantity of 90 per cent. alcohol, becoming opalescent on dilution. Resembles ordinary Dalmatian sage oils, but differs decidedly from the latter in being laevorotatory.—Schimmel's Rep., Oct., 1910, 112.

Dalmatian Sage Oil—Variation in Characters of Authentic Samples.—

Schimmel & Co. mention that the extent to which the character of oils is influenced by the season and the conditions of the distilling material is shown by two authentic Dalmatian sage oils which reached them some time ago and were subjected to examination. One of the samples, which had been distilled in August from dried sage, showed normal properties in every respect ($d_{15°}$ 0.9165; a_D + 25°; $n_{D20°}$ 1.45871; acid v. 1.0; ester v. 9.3). The sp. gr. of the other, prepared in May from the green herb, was lower than is otherwise the case with Dalmatian sage oils. As a rule the sp. gr. of such oils ranges from 0 915 to 0.930; in the case under notice it was only 0.911. It was obvious that this oil was rich in terpenes, and this was confirmed by the fact that it required 1.1 vols. 80 per cent. alcohol for solution, whereas the oil distilled in August was soluble in 4 vols. 70 per cent. alcohol. The other constants of the oil were normal: a_D + 20° 22′, acid v. 1.0, ester v. 10.3.—Schimmels' Rep., Oct., 1911, 80.

Syrian Sage Oil—Constants.—A sample of sage oil imported by Roure-Bertrand Fils from Syria gave the following constants: Sp. gr. at 15°, 0.9843; opt. rot. —6° 8′; soluble in 1.5 vols. and more of 70 per cent. alcohol, and in its own vol. and more of 80 per cent. alcohol.—Schimmel's Rep., Oct., 1911, 80; from Ber. von Roure-Bertrand Fils, April, 1911, 25.

Salam Oil—Source and Properties.—Schimmel & Co. describe a new oil distilled from the leaves of *Eugenia occlusa*, Kurz (*Syzygium occlusum*, Niq.) in Java, where it is known as "Salam Oil." The plant, which yields only about 0.05 per cent. of this volatile oil, is highly esteemed by the Javanese as a condiment. The dark brown oil contains besides other aldehydes a considerable proportion of citral, and crystals of a substance (paraffin?) begin to separate at as high a temperature as + 12°. The constants of the oil were as follows: $d_{15°}$ 0.9567, a_D —1° 40′, $n_{D20°}$ 1.48614, soluble in 0.5 vols. and more of 90 per cent. alcohol.—Schimmel's Rep., April, 1911, 123.

Samphire Oil—Constituents.—Delépine records the results of his investigations regarding the constituents of samphire oil (oil of *Crithmum maritimum*, N. O. Umbelliferæ). Up to the present the only known constituents of this oil were dillapiol and two hydrocarbons, one of the latter probably d-pinene. The presence of the latter has now been confirmed, together with dipentene. In a fraction boiling between 210° and 214° C., the author discovered the presence of "thymol methlyester," a body which in common with other thymol ethers has hitherto not been detected in essential oils, although the ethers of carvacrol frequently occur in such oils. By treating this methyl ether with hydrobromic acid in glacial acetic acid solution, the author obtained thymol. This fraction also contained small quantities of other bodies, including phenols, a highly-molecular fatty acid, and an alcohol with a rose-like odor, but the small

quantity of available material prevented a nearer examination.—Schimmel's Rep., Oct., 1910, 112–113; from Compt. rend., *150* (1910), 1061.

Sandalwood Oil—Primitive Method of Preparation in Southern British India.—Mr. Werner Reinhart, of the firm of Volkart Bros., Winterthur, Switzerland, has communicated some interesting particulars concerning the preparation of sandalwood oil in Southern Kanara, British India, according to which this oil industry is centered principally in the district northeast of Karkul up to the foot of the Ghats, the material consisting principally of wood from Coorg and Mysore. The stills consist of a ball-shaped earthenware vessel about 2½ feet high and 6½ feet in circumference, with a circular opening. There is no helm, and when the still is full it is simply covered with an earthenware cover, bearing a bent copper tube about 5½ feet long, ending in a copper receiver which rests in a porous earthenware dish filled with water. The wood, cut into strips, is placed in the still; water is added, and the distillation of the same charge is continued uninterruptedly day and night for a whole month—fresh supplies of water, taken luke-warm from the cooling vessel, being poured into the still about 15 times every twenty-four hours. The yield of oil is given as follows: Roots, about 4.34 per cent.; "Jugpokals," 3.47 per cent.; "Ain Chiltas," 2.60 per cent. The oil is partly brought to market at Udipi and partly at Mangalore—the latter being the most important center. Schimmel & Co. observe that under the primitive conditions described, it is impossible to obtain any real good sandal oil. Owing to the prolonged duration of the distillation, decomposition products must necessarily be formed, which injuriously affect the quality, color and odor. A sample of oil distilled in India, accompanying Mr. Reinhart's description, gives the following constants: Sp. gr. (15° C.), 0.9898; opt. rot. = —8°; acid number, 3.7; ester number, 7.1 (=2.8 per cent. esterified santalol); ester number after acetylation, 205.3 (=95.4 per cent. entire santalol); insoluble in 70 per cent. alcohol; soluble in 1 vol. and more 80 per cent. alcohol. The extraordinarily high specific gravity, the extremely unpleasant, train-like odor, and its insufficient solubility, are the chief proof of contamination by decomposition products.—Schimmel's Rep., October, 1910, 114–115.

East Indian Sandalwood Oil—Constituents.—The manufacture of various oils from the first runnings of sandalwood oil has afforded to the chemist of Schimmel & Co. an opportunity of submitting the separate constituents of this oil to closer examination, 11.7 kilos of the first runnings, obtained in 6 fractions at temperatures of from 76° to 120° C. being available for this purpose. The results of these investigations are here summarized as follows: The first runnings of sandalwood oil contain fatty aldehydes, among which the presence of *iso*valeric aldehyde was established. Among new compounds which have heretofore not been observed

in sandalwood oil (or any essential oil) the occurrence of a ketone $C_9H_{14}O$, santenone (nor-camphor), santenone-alcohol, $C_9H_{16}O$, a hydrocarbon, $C_{11}H_{16}$, nor-*cyclo*-ɛksantalal, $C_{11}H_{16}O$, and teresantalol, have been proven. The presence of santalone, the ketone previously isolated by F. Müller, was confirmed, and the presence of a ketone which may prove to be an isomeride of santalone was likewise observed. The santalenes were prepared in a purer form than heretofore and converted by hydration into a tertiary alcohol $C_{15}H_{26}O$; while as a result of the more accurate fractionation of the santalenes, their relations to the santalols have also been made clearer. Similarly, also, this examination has for the first time established in an unequivocal manner the presence of a cyclic ketone and of an alcohol of the norterpene series, as well as an aldehyde of the homoterpene series. It should be added that the first (1.24 kilos) and second (3.5 kilos) fractions contained chiefly santene, the third (1.975 kilos) contained the bodies which were examined in special detail, and partly also sesquiterpenes, while the fifth (2.08 kilos) and sixth (0.7 kilo) fractions consisted almost entirely of sesquiterpenes.—Schimmel's Rep., Oct., 1910, 117–128.

African Sandalwood Oil—Adulterant.—W. Lenz states that the bark of the Karambusi tree (*Warburgia Stuhlmanni*, Engl.), is an article of commerce in Zanzibar, where it is used in the same way as sandalwood. It was supposed that the oil from this bark was used for adulterating African sandalwood oil, and the author has investigated the bark and its essential oil with a view to deciding this point. The drug occurs in hard rolled pieces about 60 Cms. long and 7–11 Cms. in diameter, and when freshly powdered has a powerful aromatic odor resembling that of sandalwood oil. It has a high specific gravity and gives a yellowish-red color to water. The powdered bark was distilled in steam for six hours, and the distillates, after saturation with common salt, extracted with a mixture of ether and petroleum spirit. The ethereal solution on evaporation left a thick yellowish-red slightly fluorescent oil, which had the following constants: Specific gravity, 0.9864 at 20° C.; optical rotation at 20° $[a]_D = -41.77°$; refraction, $n_D = 1.51269$ at 20°; saponification number, 11.2; acetyl value, 100.3, which corresponds to 40 per cent. of alcohols calculated as santalol, $C_{15}H_{26}O$, but the presence of santalol was not definitely proved. Besides alcohols and esters, the oil contained aldehydes and traces of acids. The oil rapidly oxidizes in air and develops a red color. It mixes clear with its own weight of 90 per cent. alcohol, and this is the only property in which the oil differs markedly from an East African sandalwood oil, described by Schimmel & Co. in 1908, which was obtained from the wood of a species of Osyris. A chemical examination of the bark showed the presence of 1.4 per cent. of mannite, in addition to phlobaphene, tannin, coloring matter, bitter principles, and saccharine bodies. The total optical effect of the sugars was lævorotatory, and both

monosaccharides and their anhydrides were present.—Pharm. Journ. and Pharmacist, April 8, 1911, 461; from Ber. d. Deutsch. Pharm. Ges., 7 (1910), 351.

Guiana Sandalwood Oil—Properties and Constants.—C. Jeancard and C. Satie have distilled an essential oil from sandalwood which came from Guiana, but as to the botanical origin of which nothing could be identified. The analytical constants of the oil were as follows: $d_{15°}$ 0,9630 to 1,0122, a_D + 0°30′ to —6°, sap. v. 13 to 65 to 117, sol. in 1.5 to 12 vols. 75 per cent. and in 0.8 to 1.1 vols. 80 per cent. alcohol. The oil contained from 59 to 80 per cent. of a fraction boiling between 155 and 160° (20 mm.) ($d_{26°}$ 1.024 to 1.037; a_D —4° 20′ to —6°; sol. in 1.8 vols. 70 per cent. alcohol).

The properties of the oil depend in a large measure upon the nature of the raw material, for which reasons samples were distilled from branches, trunks and logs from which the bark had been removed. The constants of the oils distilled from these several lots are given by the authors, who mention further that the fraction boiling between 155° and 160°, a is body which they have named

Marionol.—This is probably a tertiary alcohol, and gave the following constants: b. p., 155° to 159° (20 Mm.); sp. gr. at 23°, 1.0378; a_D, —6°. Soluble in 1.6 vol. 70 per cent. alcohol, 2.7 vol. 65 per cent. alcohol, and 6.5 vol. 60 per cent. alcohol.—Perfum. and Essent. Oil Rec., 2 (1911), 70.

In connection with the above, Schimmel & Co. state that they have themselves distilled oil from Guiana sandalwood in the year 1910. At the time Dr. Giessler, Curator to the Botanical Institute of the University of Leipzig, informed them that the wood belonged to the N. O. Lauraceæ, and was probably derived from three species of the Genus *Acrodiclidium* or *Ocotea*. The oils distilled by them gave the following constants:

	I	II	III
Yield	3.28%	2.48%	4.14%
$d_{15°}$	1.0036	0.9570	0,9990
a_D	—4°26′	—0°46′	—0°44′
Acid v.	1.9	3.7	0.9
Ester v.	10.6	68.8	2.4
Ester v. after acet.	72.9	113.3	54.1
Solubility in 80% alc.	1 vol. a. m.	2 vol. a. m.	1 vol. a. m.

—Schimmel's Rep., Oct., 1911, 82–83.

Santolina Oil—Properties.—Santolina Chamæcyparissus L., a plant indigenous to Southern Europe and much cultivated as a garden-plant, is distinguished by its powerful, penetrating aromatic odor, and was formerly official on account of its therapeutic properties—being to this day used

popularly (as antispasmodic and anthelmintic) throughout its native region. Schimmel & Co. have distilled the oil from a sample of the herb received from Turin, obtaining 0.47 per cent. of a dark-brown oil having an odor reminding somewhat of wormwood, or rather of tansy, and showing the following constants: $d_{15°}$ 0.9065; $n_{D20°}$ 1.50040; acid v. 6.6; ester v. 16.4; ester v. after acetyl, 74.2; opt. rot. impossible to determine on account of the dark color. The oil was soluble in 0.5 vols. and more 90 per cent. alcohol, with elimination of paraffin; insoluble in 80 per cent. alcohol. So far no further particulars of its composition have been ascertained, but judging from the odor, thujone appears to be one of the constituents.—Schimmel's Rep., Oct., 1911, 108.

Dalmatian Oil of Satureja Cuneifolia—Characters and Components.—Schimmel & Co. received four samples of volatile oil distilled in Dalmatia by Dr. Giaconi, of Trieste, from *Satureja Cuneifolia*, Tenore. These oils were brownish-yellow and had an odor reminding of thyme—their other characteristics being as follows:

	$d_{15°}$.	a_D.	$n_{D20°}$.	Phenols.	Soluble in
1.	0.9182	—4° 45′	1.49816	28%	1.2 vol. a. m. 80% alc.
2.	0.9190	—5° 15′	1.49824	34%	1.1 vol. a. m. 80% alc.
3.	0.9444	—2° 15′	1.50528	59%	2.5 vol. a. m. 70% alc.
4.	0.9440	—1° 50′	1.50556	59%	2.7 vol. a. m. 70% alc.

Samples Nos. 1 and 2 were insoluble in 10 vols. 70 per cent. alcohol, Nos. 3 and 4 were soluble in about their own vol. of 80 per cent. alcohol. The phenols consisted of carvacrol, the non-phenols had a pronounced odor of cymene, but the samples at disposal were too small to prove the presence of that body.—Schimmel's Rep., Oct., 1911, 109.

Savin Oil—Presence of Sabinol in form of Acetic Acid Ester.—The experiments of Elze make it clear that the high rotation of savin oil is not due to sabinol, but to the acetic acid ester of the latter. He isolated from this oil about 45 per cent. of a constituent with a more powerful odor than that of the original oil, having the sp. gr. at 15° of 0.960, an opt. rot. of + 68°, and containing 83 per cent. of sabinol acetate, identified as such by saponification and the isolation of pure sabinol. In the low boiling fractions of savin oil the author observed the presence of *n*-decylic aldehyde, and in the high boiling portions the presence of geraniol was demonstrated and identified by its diphenyl urethane, as well as by oxidation into citral and dihydrocuminic alcohol.—Schimmel's Rep., Oct., 1910, 130–131; from Chem., Ztg., *34* (1910), 767.

Oil of Spearmint—Odorous Constituent.—F. Elze finds that when *l*-carvone is prepared from oil of spearmint by Tiemann's method, an oil is obtained as a by-product which has a more intense spearmint odor than the original oil. On fractionating this by-product, and saponification of the higher boiling fraction, the author succeeded in separating acetate of dihydro-cuminic alcohol, which has the characteristic odor of spearmint, to the presence of which it is very apparent, the odor of the natural oil is due.—Pharm. Journ. and Pharmacist, Dec. 31, 1910, 787; from Chem. Ztg., Nov. 5, 1910, 1175.

Dalmatian Spike Oil—Satisfactory Quality.—Schimmel & Co. state that two samples of spike oil distilled in Dalmatia were recently submitted by them to examination, the results proving that it is possible to prepare suitable spike oil in that country. Both oils had the pleasant, refreshing aroma of the French distillate and gave the following constants:

	$d_{15°}$.	a_D.	a_D of the initial of 10%.	acid v.	ester v.
1.	0.9033	$-0°53'$	$+ 0°16'$	0.9	5.6
2.	0.9032	$-0°10'$	$+ 2°14'$	0.9	5.4

The ready solubility of the samples is worthy of note, both of them giving a clear solution with 4 to 5 vols. 60 per cent. alcohol. The slight lævorotation does not denote any abnormality, for they have themselves distilled spike oils in the South of France, from selected material, which rotated slightly to the left. Schimmel's Rep., Oct., 1911, 85.

Spanish Spike Oil—Properties.—Schimmel & Co., having received a small parcel of spike flowers from Spain, of which the botanical derivation from *Lâvandula Spica*, D. C. (*L. latifolia*, Vill.) was confirmed by a special examination. They were subjected to steam distillation yielding 1.9 per cent. of a brownish-yellow oil showing the following constants: $d_{15°}$ 0.9100, a_D $-2°$ 20', a_D of the initial 10 per cent. of the distillate $+ 1°$ 10', $n_{D20°}$ 1.46823, acid v. 3.7 ester v. 7.0. The oil was soluble in 2 vols. 70 per cent. alcohol; when more than 4 vols. of the solvent was used, paraffin separated out and opalescence ensued. The oil possesses the same characteristics as do the oils which are brought into commerce from Spain under the name of "Spanish lavender oils," so that these oils also are probably in reality spike oils. The darker color and slightly lower degree of solubility of the sample distilled by Schimmel & Co. were due to its more exhaustive distillation.—Schimmel's Rep., Oct., 1911, 85.

Oil of Thymbra Spicata— Yield, Constituents and Constants.—Schimmel

& Co. have distilled the oil from the herb of *Thymbra Spicata*, L., a shrub-like labiate indigenous to Greece and Asia Minor—this particular parcel coming from Smyrna. The yield was 1.5 per cent. of a yellowish oil, having an odor reminding of thyme and origanum; containing about 66 per cent. of carvacrol, and having the following constants: sp. gr. (15°), 0.946; opt. rot., + 0; refract. index. (20°), 1.50675; soluble in 3.5 vol. of 70 per cent. alcohol.—Schimmel's Rep., Oct., 1910, 147.

Oil of "Wood Majoram" (Thymus Mastichina, L.)—Properties and Constituents.—Although considerable quantities of *Thymus mastichina*, L., a plant which has its habitat in the region of the Mediterranean, are cultivated in Spain, where it is known as "wood majoram" (*Majorana silvestre*), nothing is yet known of the constitution of the oil distilled from this plant, which is an export article from that country. Authentic samples of this oil have now been examined by B. Dorronsoro, who describes it as being of a bright yellow color, darkening with age, and having a camphoraceous odor reminding of thyme. Its constants are as follows: $d\frac{20°}{15°}$ 0.907 to 0.945; a_D —0° 50′, to +4° 40′; $n_{D23°}$ 1.4650 to 1.4654; sap. v., 12.7 to 18.5; ester content, 4.44 to 6.47 per cent. (calculated as linalyl acetate) ester v. after acet. 29.2 to 49.3 =8.2 to 14.09 per cent. alcohol $C_{10}H_{18}O$. Soluble in half its vol. of 90 per cent. alcohol, and in 1 to 3 vols. of 80 per cent. alcohol. According to the author's experiments the oil of *Thymus mastichina*, L., is shown to have the following constitution: *d-a Pinene*, 7 to 8 per cent.; cineol, 64 to 72 per cent.; phenols and ketones (?), each under 0.1 per cent.; esters (linalyl acetate), 4.44 to 6.47 per cent.; free alcohol, 8.2 to 14.1 per cent.—Schimmel's Rep., April, 1911, 111; from "Contribucion al estudio de las esencias espanolas," Madrid, 1910.

Oil of Trifolium Incarnatum—Yield and Constants.—H. Rogerson has distilled the flowers of *Trifolium incarnatum*, L., obtaining 0.029 per cent. of oil, calculated for the dry material, or 0.006 per cent. calculated for the fresh flowers. The oil was pale yellow, had a powerful odor, and contained furfurol. It distilled between 120° and 180° C. (15 Mm.), had the sp. gr. (20°) of 0.9597, an opt. rotation of —1° 48′.—Schimmel's Rep., Oct., 1910, 132; from Journ. Chem. Soc., *97* (1910), 1004.

Oil of Trifolium Pratense—Yield and Constants.—Power and Solvay have distilled a volatile oil from red clover flowers (*Trifolium pratense*, L.), obtaining a yield of 0.028 per cent. calculated for the dry material, or 0.006 per cent. calculated for fresh material. The oil had a rather unpleasant odor and possessed the following constants: Sp. gr. (20°) 0.9476; opt. rot. = +4°10′. Furfurol was found to be one of its constituents.—Schimmel's Rep., Oct., 1910, 132; from Journ. Chem Soc., 97 (1910) 232.

Commercial Turpentine Oils—Official Definition.—In view of the unfavorable criticisms of the present definitions of commercial turpentine oils by Vézes before the second "White Cross Congress" held in Paris (1909), the Executive Committee of that Congress has authorized the following definition proposed by Vézes and formulated by him as conclusively and accurately meeting the requirements which turpentine oils should answer:

Turpentine oil is the exclusive product of the aqueous distillation (distillation with water or non-superheated steam) of the turpentine derived from various species of *Pinus*. It is a colorless, often slightly yellowish or greenish, liquid, very mobile, with a characteristic odor. Under a normal pressure of 760 Mm., the oil begins to boil between 152 and 156°; at least 80 p. c. by weight must have passed over at 164°. The oil should be neutral or give only a faint acid reaction; the permissible acid-content, estimated with phenolphthalein as an indicator, must not exceed 1.5 g. pure potassium hydrate (KOH) for every kilogram of oil. The oil must also be free from mineral oils and in fact, from all bodies other than those generated in the course of the aqueous distilation of turpentine. It may contain small proportions of resin-oil and colophony, resulting from the process of manufacture, but the aggregate weight of these may not exceed 2.5 per cent.

The oil from *Pinus maritima* (France, Spain, Portugal) is lævorotatory, a_D —29 to —33°; $d_{25°}$ not below 0.8575. The oil from *Pinus halepensis* (Greece, Algeria, Provence) is dextrorotatory, a_D + 38, to + 41°; $d_{25°}$ not below 0.8850. The American oils, which are obtained from different species of *Pinus* (*P. palustris*; *P. heterophylla* and others) are partly dextro- and partly lævorotatory; the rotation is very variable, but never higher than in the European oils. $d_{25°}$ not below 0.8560.—Schimmel's Rep., April, 1911, 112–113; from "A Phamphlet of Feret et Fils," Bordeaux, 1910.

Oil of Turpentine—Value of the Glacial Acetic Acid Test of the B. P.—It has been proposed to dismiss the glacial acetic acid test (solubility in equal volume) for oil of turpentine from the British Pharmacopœia. F. H. Alcock, however, registers a plea for its retention on the ground that modernly oil of turpentine is being submitted to a very insidious kind of adulteration which neither specific gravity, nor boiling-point, nor fractionation test can detect, but which can easily be shown by the glacial acetic acid test, which produces a marked blue fluorescent liquid indicative of the presence of some paraffin body (?), possessing physical characters not unlike those of oil of turpentine. The U. S. P. states that oil of turpentine is soluble in three times its volume of alcohol (94.9 per cent. by volume), and this sample does not respond to the test, there being left a lower layer of 0.9 Cc. when 3 Cc. of oil are mixed with 6 Cc. of spirit

and 0.7 Cc. when mixed with 9 Cc. of spirit.—Pharm. Journ. and Pharmacist, Aug. 20, 1910, 275.

Oil of Turpentine—A Petroleum Substitute.—U. S. Consul Skinner, of Hamburg, reports on the manufacture in Germany of a substitute for oil of turpentine from heavy Borneo-petroleum. According to this report the first experiments on utilizing the heavy portions of Borneo-petroleum for this purpose were undertaken five years ago by an English company. Since then German firms have embarked in the business of producing this substitute, which, according to Eibner, of the Munich Technical High School, is very well suited for use in the varnish industry.—Schimmel's Rep., Oct., 1910, 140; from Oil, Paint and Drug. Rep., 77 (1910), No. 16, 28.

Oil of Turpentine—Adulterants.—Schimmel & Co. discuss the various methods that have been suggested for the detection of adulterants in oil of turpentine, among others that recommended by Nicolardot and Clément (Bull. Soc. Chim., iv 7 (1910), 173), which is particularly adapted for the detection of petroleum distillates and other volatile *unoxidizable* bodies: Dissolve 70 Gm. mercurous acetate in 150 Cc. of acetic acid in a flask, add 50 Cc. of the suspected oil and heat the whole for 30 minutes on the water-bath, using a reflux condenser. Then distill with steam and ascertain the volume of oil which has passed over. Pure oil of turpentine is completely oxidized and remains as a non-volatile residue; any volatile portion, therefore, indicates adulteration.—Schimmel's Rep., Oct., 1910, 138 (and 134–140).

Oil of Turpentine—Adulteration with Copal Oil.—W. Vaubel calls attention to an adulteration of oil of turpentine with copal oil, which was found by him in a recently-examined sample to the amount of 30 per cent. The observation is the more interesting since when compared with the various adulterants that have been discovered—commonly petroleum benzins, rosin oils, etc.—it is the least useful for this purpose, remaining on evaporation as an oily mass of acid reaction and having other undesirable properties.—Pharm. Ztg., lv (1910), No. 67, 676; from Ztschr. f. angew. Chem., 1910, No. 25.

Wallflower Oil—Preparation and Properties.—From the flower of *Cheiranthus Cheiri*, L (the common "wallflower"), E. Kummert obtained by extraction with low-boiling solvents a dark-colored extract of an ointment-like consistency which when freed from wax and fats by means of strong alcohol und subsequent subjection to steam-distillation, yielded 0.06 per cent. (calculated on the flowers? Rep.,) of an oil having the following constants: b. p. 40° to 150° (3 Mm.); sp. gr. at 15°, 1.001; acid val., 0.35; ester val., 20.0; sapon. val., 20.35. When strongly diluted this oil had the natural odor of the flowers, but in the concentrated state it had a disagreeable odor. Subjected to fractionation *in vacuo* (3 Mm.),

a small fraction of bodies boiling below 40° was obtained. These bodies had an unpleasant odor, and were probably of the nature of mustard oil. From the higher boiling fractions, a mixture of odorous bodies was obtained, pointing to the presence of *anisic aldehyde* and *irone*. Furthermore, after freeing the oil from ketones and aldehydes, the presence of *nerol*, *geraniol*, *benzyl alcohol*, *linalool*, traces of *phenols* and *lactones*, together with *acetic acid*, *salicylic acid*, *and anthranilic acid* were determined. Finally, from the highest boiling fractions, which had a well-marked odor of indole, the author isolated the *methylester of anthranilic acid*, *indole*, and a small proportion of bases with an odor reminding of *pyridine*.—Schimmel's Rep., Oct., 1911, 95; from Chem. Ztg., *35* (1911), 667.

Dalmatian Wormwood Oil—Source and Properties.—Schimmel & Co. have examined an oil prepared in Dalmatia from wild-grown wormwood, which gave the following constants: Sp. gr. at 15°, 0.9188; acid value, 1.3; ester value, 64.4. It was soluble in its own vol. 80 per cent. alcohol, the solution remaining clear when more alcohol was added. So far as aroma is concerned, this oil, which has a brown color, is by no means able to compete with wormwood oil from cultivated herb. It is possible that the parent-plant of this oil was not *Artemisia absinthium*, L., but another species of *Artemisia*, but they have been unable to obtain any information with regard to this.—Schimmel's Rep., Oct., 1911, 101.

Oil of Xanthoxylum Alatum—Yield and Constants.—Schimmel & Co. distilled from the fruit of *Xanthoxylum alatum*, Roxb., received from London under the name of "Chinese Wild Pepper" (habitat Northern Bengal and China), a volatile oil in a yield of 3.7 per cent., and, continuing the distillation, an additional yield of 0.9 per cent. of a crystalline substance, which could not be dissolved in the oil in the proportions obtained. *The oil* was lemon-yellow in color, had a peculiar aroma, reminding of oil of water-fennel, and gave the following constants: Sp. gr. (15°), 0.8653; opt. rot., —23° 35′; index of refraction (20°), 1.48131; acid number, 9.9; ester number, 10.3; ester number after acetylation, 33.6; soluble in 2.6 vol. and more of 90 per cent. alcohol. The oil appears to consist chiefly of hydrocarbons, the nature of which remains to be determined by further investigation. The odor suggests the presence of phellandrene.

The crystalline substance, after two crystallizations from alcohol, presented colorless, odorless, optically inactive needles or leaflets, melting at 83°; very readily soluble in ether, chloroform, and acetone; a little less readily soluble in alcohol, benzene, and light petroleum (benzin); insoluble in water. It is not an acid, but appears to be a phenol or lactone-like compound, as is evident from the fact that it does not react with alkaline carbonates, while it does so readily with caustic alkalies, forming

solutions from which it again separates on acidulation.—Schimmel's Rep., Oct., 1910, 147.

Oil of Xanthoxylum Ochroxylum—Properties and Composition.—According to Leprince, the bark of *Xanthoxylum ochroxylum*, D. C., known in Venezuela as "Bosuga blanca," yields to light petroleum 6 per cent. of an oil having a sp. gr. at 15° of 0.945, a stinging, acid, astringent taste, and a refreshing odor. The oil so obtained is probably a mixture of fatty and volatile oils.—Schimmel's Rep., Oct., 1911, 102; from Bull. Sciences pharmacol., *18* (1911), 345.

DERIVATIVES OF VOLATILE OILS.

Synthetic Camphor—Continued Improvement in German Manufacture.—Gehe & Co. report that while in other countries some of the manufacturers of synthetic camphor have relinquished their efforts to compete with the natural product, owing to the continued high price of oil of turpentine and the reduction in the price of Japanese camphor, the restless energy of German manufacturers in improving and devising new methods has enabled them to compete successfully and to maintain the position of synthetic camphor on the market. The outlook for a continuation of the manufacture of synthetic camphor is the more encouraging, since it has been clearly proven that the artificial product possesses identically the same therapeutic properties and practically the same chemical characters as the natural.—Pharm. Ztg., lvi (1911), No. 32, 321.

Camphor—Simple Method of Assay.—Camphor, being of a ketonic character, forms with hydroxylamine a well-defined oxim, $C_{10}H_{16}NOH$, and this is taken advantage of by H. C. Fuller for the assay of camphor preparations, the procedure being so simple that it may be applied direct to spirit of camphor. Twenty-five Cc. of the spirit are measured into an Erlenmeyer flask of 100 Cc. capacity, 2 Gm. of sodium bicarbonate are added, and then, accurately, from a burette 35 Cc. of a hydroxylamin solution (20 Gms. $NH_2OH.HCl$+30 Cc. H_2O+125 Cc. absolute alcohol aldehyde free). The flask is connected with a reflux condenser and heated to gentle boiling for two hours; it is then cooled to 25° C., treated with a mixture of 6 Cc. hydrochloric acid (1.12 specific gravity) and 6 Cc. water, transferred to a 500 Cc. volumetric flask, rinsing out the condenser and flask with water, and finally made up to volume; 55 Cc. portions are filtered off and titrated as follows: Methyl orange is added and the mineral acid neutralized with normal alkali, then phenolphthalein is added, and the hydroxylamin hydrochlorid titrated with tenth-normal alkali. A blank must be run using the same amount of hydroxylamin solution and 25 Cc. of alcohol to correspond with the spirit of camphor, the difference in titrations representing the hydroxylamin converted into camphor oxim. Each cubic centimeter of tenth-normal sodium hydroxide is equivalent to

0.01509 Gm. of camphor.—Pharm. Journ. and Pharmacist, Sept. 16, 1911, 381.

Camphor—Tests of Identity and Purity.—W. Lenz has made some comprehensive studies regarding the tests of identity and purity of camphor. He finds that the determination of the melting point affords an excellent criterion and aid to establish the purity of a sample. The optical rotation, however, gives no reliable data for the valuation of crude camphor, the impurities of which show a stronger rotatory power than pure camphor; it is of value, however, to determine whether or not the sample consists of natural d-camphor. While the determination of the residue of evaporation is a valuable aid to establish the purity of camphor, this is too tedious and consequently impracticable. The conversion into oxim has been improved by the author so that a yield of about 93 per cent. instead of from 75 to 85 per cent. is obtainable; but a valuation of the sample is also impracticable because the disparity between the theoretical and actual yield of oxim is still too great. The vanillin-hydrochloric reaction is of service only for the identification of natural camphor; moreover, the red color of this reaction is exceeded by that produced by pure hydrochloric acid (38 per cent. HCl) on natural camphor. But the amount of substance insoluble in 10 parts of this strong hydrochloric acid affords an excellent criterion for estimating the impurities in commercial camphor, which may serve well as a basis for a reliable process. In point of fact, however, it may be said that no single reaction will serve to give a clear view of the composition of crude camphor, which becomes possible only by a combination of the various tests and reactions proposed.—Arch. d. Pharm., *249* (1911), No. 4, 286–298.

Camphor—Loss by Vaporization when Stored in Paper Cartons.—Alex. Gunn directs attention to the loss, not usually taken into account, when "Flowers of Camphor" is stored in card-board cartons, as is now the prevalent practice. Such a carton, containing about 10½ oz., lost 250 grains in weight when stored in a warehouse, not artificially heated, during 6 winter months, equal to 11 per cent. per annum—Though it would have been more likely 15 per cent. if stored during the entire year, including the 6 summer months.—Pharm. Journ. and Pharmacist, Dec. 16, 1911, 811.

Camphor Monobromate—Estimation of Bromine.—André and Leulier recommend the following method for estimating the bromine in camphor monobromate, which is based upon the observation of Schiff that by the action of sodium on camphor monobromate (in toluol-solution) a compound of camphor and sodium and, quantitatively, sodium bromide are formed. Into a flask of 125 Cc. capacity, 0.5 Gm. of camphor monobromate, 10.0 Gm. toluol, and about 1.0 Gm. of metallic sodium are placed, and heated under a reflux condenser about one hour. After cooling

30 Cc. of water are added to the contents of the flask, to destroy the metallic sodium used in excess; the mixture is acidulated strongly with nitric acid and 25 Cc. of $\frac{N}{10}$ silver nitrate solution is added, which precipitates silver bromide. The excess of silver nitrate is then titrated with sulphocyanide solution, and thus indirectly the quantity of bromine is determined.—Pharm. Ztg., lv (1910) No. 65, 657; from Journ de. Pharm. et. Chim., 1910, No. 2.

Dehydrodicarvacrol—Preparation from Carvacrol.—H. Cousin and H. Hérissey have previously shown that thymol, in aqueous solution, is converted into dithymol by prolonged contact with dilute ferric chloride solution. They have now succeeded in obtaining dicarvacrol, or dehydrodicarvacrol, by the same method, starting with carvacrol. A saturated aqueous solution of carvacrol is treated with a small quantity of ferric chloride solution and the mixture set aside for several days. A yellowish-white crystalline precipitate gradually forms; after ten days this is collected, then left in contact with very dilute sodium hydroxide solution, and subsequently filtered. The filtrate is then acidified with acetic acid, which liberates the dehydrodicarvacrol in the form of white flocks, which quickly crystallize into fine needles. The yield is about 20 per cent. of the carvacrol taken. When recrystallized from alcohol it forms long, silky, colorless needles. It loses two molecules of water at 110° C., and then melts at 165–166° C.; if merely air-dried and heated quickly to above 100° C., it melts, and again solidifies when the water has disappeared. Although it contains two free phenol groups, it does not give any color reaction with ferric chloride. It is soluble in dilute alkalies, in ether, and in alcohol. Dehydrodicarvacrol is not formed, as dehydroisoeugenol is from isoeugenol, by the action of ferric chloride on alcoholic solutions of carvacrol at 50° C. A totally distinct product results, which is insoluble in alkalies, and is precipitated from ether solution by the addition of alcohol. The same substance is also formed by the action of the ferment of *Russula delica* on carvacrol.—Pharm. Journ. and Pharm., Nov. 12, 1910, 577; from Journ. de Pharm. et Chim., 1910, *2*, 49.

Cheirolin—Chemical Constitution and Properties.—W. Schneider has studied the chemical constitution of cheirolin, a sulphurous body obtained some years ago by Wagner from the seeds of the wallflower (*Cheiranthus*), and has identified it as a mustard oil,

γ-Thiocarbimido-propyl-methyl-sulphone, to which he assigns the constitutional formula: $CH_3.SO_2.CH_2.CH_2.CH.N:C:S$. He finds that cheirolin also occurs in the seed of *Erysimum arkansanum*. It is prepared by extracting wallflower seed with ether, to remove the fixed oil, then adding 5 per cent. aqueous sodium carbonate solution to decompose the glucoside-like cheirolin-compounds, and extracting the liberated cheirolin with ether, from which it crystallizes in colorless and odorless prisms—the

yield being 1.6 to 1.7 per cent. of the seed used. Cheirolin is optically inactive, melts at 47° to 48°, boils at about 200° (3 Mm.), and decomposes when distilled at atmospheric pressure. It has a powerful irritating effect upon the mucous membranes.—Schimmel's Rep., Oct., 1910, 85; from Liebig's Annalen., *375* (1910), 207.

Cumol—A Constituent of Coal Tar.—G. Schultz has succeeded in isolating cumol (isopropylphenol) from coal tar. Its recognition arose from the formation of the mononitro product $C_9H_{11}NO_2$, which by oxidation with concentrated nitric acid was converted into *p*-nitrobenzoic acid, $C_7H_5NO_4$ m. p. 236–238° C. Cumol, of all the isomers of the formula C_9H_{12}, is characterized by having the lowest boiling point, viz., 152.5° to 153.5° C.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 664; from Ber. d. d. Chem. Ges., *43* (1910), 2517.

Pinene Chlorhydrate—Rotatory Power.—Gustav Vavon states that a solid chlorhydrate of pinene can be prepared by treating the different fractions obtained between 155° and 165° C. in the distillation of essence of terebenthene with dry hydrochloric acid gas at 30° C., and the rotatory power of this chlorhydrate shows the same anomalies as the hydride. Both α- and β-pinene give the same yield of the same solid chlorhydrate, and thus the hypothesis suggested by Semmler is confirmed.—Chem. News, Aug. 5, 1910, 71; from Compt. rend., *150* (1910), No. 22.

Terpineol—Superiority Over Oil of Cloves (or Eugenol) for Microscopic Work.—P. Mayer has experimented with the object of determining the suitability of liquid terpineol for microscopic work, and has found it to possess the following advantages over oil of cloves (or eugeneol), the material which is used for this purpose at present:

1. Liquid terpineol is colorless and remains so, whereas eugenol soon turns brown.

2. It has a faint odor, whereas that of clove oil is penetrating.

3. Although less tolerant than clove oil towards the presence of water in alcohol, liquid terpineol agrees with 90 per cent. alcohol. Sections or membranes may be transferred direct from 90 per cent., and if necessary even from 80 per cent. alcohol into terpineol.

4. It is miscible in any proportion with benzene, xylene, etc.

5. It is considerably cheaper than eugenol or oil of cloves.

6. Its index of refraction (n_D 20°, 1.481 to 1.484) is decidedly lower than that of clove oil.

7. It has no acid reaction; carmine stains are preserved in it excellently, and alum hæmatoxylin stainings do not appear to fade easily in it.

A drawback of terpineol is that collodion is practically insoluble in it.—Schimmel's Rep., October, 1910, 153–154; from a reprint of the author's paper published in Ztschr. f. Wiss. Mikros. u. f. mikros. Techn., *26* (1909), 523.

Terpin Hydrate—Precautions on Dehydration.—The French Pharmacopœia, 1908, states that when terpin hydrate is heated to 100° C., or exposed, *in vacuo*, over sulphuric acid, it loses its molecule of water, equivalent to about one-tenth of its weight. Leulier states that of these two methods of desiccation the latter is the only one suitable, since at 100° C, terpin is volatile, and after 24 hours at that temperature is wholly sublimed, leaving no residue.—Pharm. Journ. and Pharmacist, June 3, 1911, 74; from Journ. de Pharm. et Chim., 1911, *3*, 440.

Terpin Hydrate — Determination of Water of Crystallization. — The French Pharmacopœia advises that the water of crystallization of terpin hydrate should be determined by heating in an oven at 100° C., or by placing the substance in a desiccator for a sufficient length of time. Bourdet gives preference to the latter method, because the temperature of 100° is very near the melting-point of the dry terpin, which is 105° C. It is necessary then that the heat of the oven must be very well regulated in order to avoid loss of terpin by volatilization. But, even without taking this into account, at temperatures below 100° a little terpineol is produced, discernible by its odor, which vitiates the results of determinations.—Pharm. Journ. and Pharmacist, Aug. 19, 1911, 276; from Journ de Pharm. et Chim., July 16, 1911, 69.

Thymol—New Isomers.—C. Guillaumin describes two new isomers of thymol: *Orthothymol* (3-methyl 1-isopropyl 2-oxybenzene), and *parathymol* (4-methyl 1-isopropyl 2-oxybenzene). Orthothymol is prepared from ortho-cresotinic acid by the action of sulphuric acid and methyl alcohol; the ester thus obtained is converted into methyl methylortho-cresotinate; this by the action of methyl-magnesium iodide produces the tertiary alcohol, which distils at about 239–240° C. with partial decomposition; this is treated with acetic anhydride, and the product subjected to the action of sodium and absolute alcohol. The derivative thus obtained is hydrogenated, whereby the methyl ether of orthothymol is obtained; treatment with acetic hydrobromic acid yields the orthothymol. It is a colorless liquid having an odor of cresol, boiling at 225–226° C.; its solubility in water, 0.8 per liter at 17° C, is less than that of natural thymol; very soluble in organic solvents. The preparation of parathymol conforms to the same phases as for the ortho isomer. It crystallizes from acetic acid in long needles melting at 35°; boils at 228–229°. It is only slightly soluble in water; 1.66 Gms. dissolves in 1000 Cc. of water at 17°, while in the case of the natural thymol the solubility is about 1.1 Gms. in 1000 Cc. The aqueous solution of parathymol is not colored by ferric chloride. If a few fragments of the substance dissolved in 1 Cc. of acetic acid is heated with 2 Cc. of sulphuric acid and 1 Cc. of water, a yellow coloration is obtained. Under the same conditions, orthothymol and natural thymol give a very intense red-currant coloration. Orthothy-

mol is less toxic than the other two isomers, the latter being about equally toxic. As antiseptics, the natural (meta) and parathymol are equally powerful, while the ortho compound is about two times less active. The therapeutic value of natural thymol appears to be superior to that of the two new isomers, especially in their use as anthelmintics.—Pharm. Journ. and Pharmacist, Oct. 29, 1910, 517; from Bull. des Scienc. Pharmacology, July, 1910, 373.

Thymol—Value as a Preservative for Furs and Woolens.—G. Guérin mentions that there are objections to many of the substances recommended for preserving wools and furs from the attacks of insects, either from the point of view of inefficacy or disagreeableness. He therefore suggests the use of thymol in powder form for sprinkling over the garments, and then wrapping them in paper, or enclosing them in air-tight containers. This powerful antiseptic has also the advantage of deodorizing the garments and arresting putrid fermentations.—Pharm. Journ. and Pharmacist, July 8, 1911, 34; from Bull. Commerc., June, 1911, 289.

Thymol Iodide—Assay.—Calling attention to the desirability of introducing into the Pharmacopœia assay processes which are now available for the estimation of certain organic U. S. P. halogen compounds, notably those of chlorine (chloral and chloroform), according to the chloride method of Wallis or that of Self, Elias Elvove communicates the results of some preliminary experiments which lead him to suggest the following procedure for the assay of thymol iodide: The thymol iodide (0.1 to 0.5 Gm.) is treated in a 500-Cc. Erlenmeyer flask with 10 Cc. of ether, followed by 20 Cc. of $\frac{N}{2}$ alcoholic sodium hydroxide and 2 Gm. of zinc dust, and the mixture is actively boiled under a reflux condenser for one hour. The flask is then disconnected from the condenser, the contents are acidified with 10 Cc. of glacial acetic acid, and the mixture is again boiled for an hour under the reflux condenser. The condenser is then washed with about 10 Cc. of water, which is allowed to drain into the flask, and the contents of the latter filtered, using about 30 Cc. of hot water for washings. A measured quantity of $\frac{N}{10}$ $AgNO_3$ is then added to the filtrate in slight excess of that theoretically required (about 5 Cc.), and the whole actively boiled for 10 minutes, then 50 Cc. of 10 per cent. dilute nitric acid added, and again actively boiled for 5 minutes. After filtering and cooling to room temperature, the excess of silver in the filtrate and washings (about 30 Cc. with hot water) is determined with standard thiocyanate, using 5 Cc. of 10 per cent. ferric alum as indicator. The author submits a number of tables, exhibiting the results obtained under varying conditions of his experiments, which lead him to the conclusion that the assay carried out by the process here recommended gives reliable figures. —Amer. Journ. Pharm., Sept., 1910, 403–409.

Thymoquinone—its higher oxidation products—a contribution on the

revision of cymene and its oxidation products, conducted in the laboratory of Edward Kremers, is the subject of experimentation and study by Nellie Wakeman, which appears in a paper printed in the " Proceedings," 1910, 979-992.

Resins, Copals, and Balsams—Preference of Bromine Numbers Over Iodine Numbers.—W. Vaupel prefers to determine bromine numbers in resins, copals, and balsams, instead of iodine numbers, on account of the greater ease and certainty of the determination. The bromine and iodine values of 23 resins, copals, and balsams are tabulated, with references to the literature. With dammar resin and the true copals the absorption of bromine takes place slowly, and may occupy several days. In these cases the bromine number is of less value than with resins or balsams. The method of determination used was the usual one of adding solution of potassium bromide and hydrochloric acid to a solution of the substance in carbon tetrachloride, or chloroform, and titrating with solution of potassium bromate until absorption of bromide was complete, i. e., until a recognizable excess of bromine was present.—Pharm. Journ. and Pharmacist, Jan. 14, 1911, 37; from Chem. Ztg., 1910, 978.

ALCOHOLS AND DERIVATIVES.

Absolute Alcohol—Specific Gravity Not Necessarily Dependable.—J. G. McIntosh draws attention to Squibb's statement that when alcohol is rendered absolute on the large scale by percolation through a column of quicklime the alcoholometers often sink below zero. This was a matter for surprise, until it occurred to him that it was somehow due to the formation of ether, an idea which receives some support from the work of Sabatier and Mailhe on the " Mechanism of Catalytic Dehydration of Alcohols by Metallic Oxides," in which it is shown that when sulphuric acid dehydrates a primary alcohol, an ether sulphuric acid is formed and decomposes into hydrocarbon and acid, while with metallic oxides a similar intermediate product is formed. The mere fact that an alcohol, supposed to be rendered absolute in this way, registered a lower specific gravity than that given in the tables would in itself be no proof that such alcohol was in reality absolute, as a very little ether would easily lower the specific gravity of an almost but not quite anhydrous alcohol below that given in the usual tables.—Pharm. Journ. and Pharmacist, July 16, 1910, 71; from Chem. News, June 10, 1910, 275.

Ethyl Alcohol—Manufacture from Sawdust.—G. U. Borde, who has investigated the manufacture of ethyl alcohol, acetic acid, and stock food (the last two as by-products) from sawdust, as carried on by different manufacturers in Europe, gives an interestng account of the method as conducted at St. Marcel, France. He says it makes practically no difference what kind of wood is used for the manufacture of alcohol, as all yield the

same amount of alcohol per ton of wood. Oak, however, on account of the excessive amount of tannic acid which it contains, and which is a foe to fermentation, has to go through an additional treatment for the elimination of this acid before it can be fermented and its sugars converted into alcohol. In a general way, the process in St. Marcel is as follows:

The sawdust, which is drawn from a radius of about seventy-five miles from the plant, is put into a digester and a predetermined amount of water and sulphurous acid is added. The digester is closed and sealed, and external heat applied until the pressure inside reaches about 100 pounds, at which pressure the contents are kept for a certain length of time, during which the cellulose in the wood is converted into dextrin and sugars. The heat is then cut off and the usual sulphurous acid, which has been put into the digester simply to get the pressure to the required point, is reclaimed. The material in the digester, which has shrunk about 25 per cent., is then passed over to the separator, in which the acetic acid formed during the conversion is vaporized by means of a steam jet, and then collected. The converted sawdust is then brought over to the mash tanks, where its acidity is neutralized, and it is made into a mash which is fermented and distilled in the same way that an ordinary grain mash is handled in a whisky distillery.

The tailings from the still are first compressed to extract the water, and the final amount of moisture is taken out in a dryer heated by waste gases from the boilers. In France and England these dry tailings are made into stock food or brickettes; or by the addition of a small amount of magnesia, are compressed into an artificial fireproof stone, which has a crushing strength of 18,000 pounds per square inch and tensile strength of 6000 pounds. It is estimated that for every ton of theoretcally dry wood, or, in other words, for every 3200 pounds of green sawdust, one should obtain: 30 gallons of 188° alcohol; 76 pounds of acetic acid, and ¾ ton of stock food, yielding, with a cost of production of $7.00 a net profit of $26.81.—Chem. News, July 22, 1910, 41; from Manufacturer's Record.

Alcohol—Not Hygroscopic in the Ordinary Sense.—The results of an investigation by J. Wade and R. W. Merriman on the influence of water on the boiling-point of ethyl alcohol at pressures above and below the atmospheric pressure show that alcohol is not hygroscopic in the ordinary sense. Nevertheless, the authors say, the elimination of small quantities of water from nearly anhydrous spirit is so slow and partial a process, even under the most favorable conditions, that if dry alcohol be agitated with moist air the moisture which is washed out of the air, as any other vapor might be, is detained permanently in the spirit; hence the need for elaborate precautions against atmospheric contact when working with anhydrous alcohol. Probably the origin of the very general belief in the specifically hygroscopic character of alcohol is to be found in the fact that absolute

alcohol cannot be prepared from aqueous spirit by any ordinary process or fractionation. This limitation is shown to cease at low pressures, so that the belief has no longer any foundation.—Pharm. Journ. and Pharmacist, July 22, 1911, 101 ; from Journ. Chem. Soc., May, 1911, 997.

Ethyl Alcohol—Detection in Methyl Alcohol.—G. Denigés describes the following method for the detection of ethyl alcohol in methyl alcohol, which depends on the fact that when the latter is treated with bromine solution, only small quantities of formaldehyde are found, whereas under the same conditions ethyl alcohol is completely converted into aldehyde : In a long test-tube, 0.2 Cc. of the methyl alcohol is treated with a solution of 0.3 Cc. of bromine in 5 mils. of water. The mixture is heated in the boiling water-bath for five or six minutes, if the yellow color persists so long. If not, the tube is withdrawn as soon as its contents are colorless. On cooling, if there still be any yellow tint, this is removed, sodium bisulphite solution being added drop by drop, until the color disappears. Five mils. of rosaniline bisulphite reagent is then added, and the mixture set aside for five to eight minutes. If ethyl alcohol be present, the liquid will show a magenta tint, proportional in intensity to the amount of ethyl alcohol originally present. In its absence, no appreciable color will be evident in this time, since methyl alcohol alone gives no reaction under ten minutes. In this way the presence of ethyl alcohol not exceeding 1 per cent. may be readily detected. The method also serves for the detection of small quantities of ethyl alcohol in a liquid. In this case 5 Cc. of the liquid is treated with 0.2 Cc. of pure methyl alcohol and 0.5 Cc. of bromine, then treated as above.—Pharm. Journ. and Pharmacist, February 4, 1911, 133 ; from Bull. Soc. Pharm. Bordeaux, through Repertoire, *22* (1910), 535.

Alcohol U. S. P. vs. Commercial Alcohol is the subject of a paper by S. L. Hilton in " Proceedings," 1910, 958–971.

Ether—Contamination with Hydrogen Dioxide.—L. L. Walton call attention to ether purchased direct from the manufacturer in drums holding 25 pounds which, though labeled " Ether, U. S. P., concentrated. Contains 94 per cent. ethyl oxide and 4 per cent. alcohol," was complained of as unsatisfactory for use in making photo collodion containing small amounts of ammonium iodide and cadmiun iodide, owing to the liberation of iodine from them. The greater part of this ether having been sold in the course of several months, and no complaint made, it was surmised that some change had affected the ether during storage, and on submitting a sample to Chas H. LaWall for examination, he found it to contain hydrogen dioxide, which was evidently the cause of the disturbing element. Furthermore, it developed on further investigation, that ether remaining in drums which has been opened occasionally and left standing for some time, is apt to undergo decomposition, becoming acid with the

formation of hydrogen dioxide.—Proceed. Pa. Pharm. Assoc., 1910. Amer. Drugg., Aug. 8, 1910, 69–70.

Ether—Estimation in Alcoholic Mixtures.—Dr. H. Wolff recommends the following method for estimating the ether in ether-alcohol mixtures: 100 Cc. of the mixture are diluted to a sp. gr. of about 0.960, and 20 Cc. are distilled, with good refrigeration, into a 100-Cc. cylinder, graduated to 0.5 Cc. Then 80 Cc. of concentrated common salt solution are added; the mixture is vigorously shaken about twenty times, and the volume of ether separated on the surface of the liquid is noted, the limit of error by this method not exceeding 0.5 per cent., provided that not more than about 13 per cent. of ether are contained in the sample. In the latter event only 50 Cc. (or even only 25 Cc.) of the sample are taken and (after dilution to 0.960) distilled as described, the 20 Cc. of distillate being treated with common salt solution as before. The amount of ether separated must in this case, of course, be multiplied by two (or four) so as to arrive at the correct percentage. The method is with advantage also applied to the estimation of benzol in alcoholic mixtures.—Pharm. Ztg., lv (1910), No. 99, 998; from Chem. Ztg., 1910, No. 134, 1193.

Acetic Ether—Rational Method of Preparation.—According to A. Kurtenaker and H. Habermann, acetic ether is most rationally prepared from molecular proportions of alcohol and acetic acid, using nickel sulphate as a dehydrating medium. While an excess of alcohol causes the esterification of a large percentage of the acetic acid, the resulting acetic ether is contaminated with considerable quantities of alcohol, which can be removed only by a tedious process. They recommend that the reacting mixture be heated in a water-bath, under a reflux condenser, and as soon as the thermometer indicates a boiling-point of about 73° C., to reverse the condenser and collect the distillate so long as the boiling-point does not rise materially above 73°. When this occurs, the mixture is again heated under the reflux condenser until the contents of the still again boil at 73°, when the distillate is collected as before—this alternate systematic treatment being repeated until no further distillate passes over at the temperature of 73° C. This method secures the largest yield of pure acetic ether.—Pharm. Ztg., lvi (1911), No. 54, 545; from Journ. f. prakt. Chem., 1911, No. 12.

Ethyl Bromide—Preparation and Properties.—According to G. Mossler, ethyl bromide or monobrom-ethane, CH_3CH_2Br, is prepared by mixing 12 parts of sulphuric acid and 7 parts of alcohol, cooling, adding 12 parts of potassium bromide, and distilling on a sandbath; the distillate is purified by shaking it with strong sulphuric acid to remove ethyl ether, then with solution of potassium carbonate, drying on calcium chloride, and rectifying from a water-bath. When prepared by phosphorous bromide and alcohol it contains volatile impurities, and is therefore not suitable for

pharmaceutical use. Ethyl bromide is a colorless, highly refractive, volatile liquid with a peculiar ethereal odor; almost insoluble in water, miscible in all proportions with alcohol or ether; when pure its specific gravity is 1.4735, but when containing a small quantity of alcohol or ether (which increases its stability) its specific gravity should be from 1.453 to 1.457; boiling point, 38° to 40°. Ethyl bromide must have a pleasant odor, suggesting chloroform, and not at all garlic-like, the latter showing sulphur compounds; when shaken with an equal volume of strong sulphuric acid frequently during an hour, in a stoppered vessel previously rinsed out with the acid, neither liquid should become colored; when shaken with an equal volume of water for a short time the separated water layer should be neutral, and on adding silver nitrate should show no alteration within five minutes, and only a slight opalescence on longer standing (absence of hydrobromic acid).—Pharm. Journ. and Pharmacist, Febr. 11, 1911, 175; from Ztschr. d. Allgem. Oesterr. Apoth. Ver., Nov. 26, 1910, 434.

Dichlorethylene—Use as a Solvent for Iodine in Surgical Operations.—Reginald R. Bennett says that during the past twelve months a solution of iodine in dichlorethylene has been used by the surgeons at University College Hospital, instead of tincture of iodine, for the sterilization of the skin prior to operation, but several surgeons have complained of the difficulty they have experienced in obtaining supplies of the dichlorethylene solution for their private practice. There has appeared to be some doubt in the mind of a few pharmacists to whom the matter has been mentioned as to what the surgeon requires, and some confusion has arisen perhaps on account of a note which appeared in the "British Medical Journal" of May 28, 1910, by A. J. Wallace, M. D., on "The Preparation of the Skin for Operation by Means of Dichloride of Ethylene and Iodine." Mr. Bennett observes that although Dr. Wallace describes dichlorethylene and gives the formula ($C_2H_2Cl_2$) correctly, "dichloride of ethylene" has the formula $C_2H_4Cl_2$, and is a very different body. Hence the confusion. Commercial dichlorethylene is a cheap article, and though usually containing varying quantities of some of the other chlorine substitution-products of ethylene, their presence does not render the product unsuitable for surgical work. The preparation required by the surgeon is a 2.5 per cent. w/v solution of iodine, which is practically a saturated one, and which is best prepared by powdering the iodine in a mortar and triturating it with successive quantities of the dichlorethylene. The dichlorethylene solution is preferred to tincture of iodine for surgical work because during evaporation of the solvent no unpleasant lachrymation or catarrh of the mucous membrane of the nose is suffered by the surgeon or his assistants.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 623.

Trichlorethylene—Use in Analytical Processes.—L. Gowing-Scopes calls

attention to the practical utility of trichlorethylene (C_2HCl_3) in analytical operations, it being now available on the market at prices which compare favorably with those of benzene, ether, etc. It is a colorless mobile liquid, with a pleasant ethereal odor resembling that of chloroform. Specific gravity at 15° 1.4762; boiling point, 87.5°; refractive index at 19.8° $[N]_D = 1.4777$. It expands rapidly and evaporates quickly. It distils approximately thirteen times as fast as water in a current of steam, and is non-inflammable. As a menstruum for extracting alkaloids it is found that narcotine is extracted both from acid and alkaline solution, and morphine is not extracted from either. Atropine, cocaine, quinine, cinchonine, strychnine, brucine, veratrine, pilocarpine, and aconitine are extracted from alkaline, but not from acid solution. It readily dissolves nitrous acid, forming a green liquid, which appears to keep well for some time; it should prove useful for diazotisation when the presence of water is objectionable. Water is only slightly soluble in trichlorethylene. It has distinct advantages over ether, petroleum ether, and other solvents for the estimation of fats; being non-inflammable, the fat-flask may be heated directly with a flame, thus doing away with the usual water-bath. As to its chemical behavior, it does not give the isocyanide reaction, while chloroform and carbon tetrachloride do. It does not reduce Fehling's solution; the two latter do. It is unattacked by potassium hydroxide, while the other two are decomposed. It is only slowly attacked by boiling sulphuric and hydrochloric acids, but hot nitric acid attacks it violently. The vapor, when inhaled in small quantities diluted with air, gives headache to some people, while others are unaffected; in large quantities it is like the other anæsthetics. It has a burning taste, irritates the throat, and causes coughing. It dissolves practically all organic compounds that do not contain two or more carboxyl or hydroxyl groups, also some inorganic substances. Being an unsaturated compound, it cannot be employed with oxidizing agents.—Pharm. Journ. and Pharmacist, Aug. 30, 1910, 299; from Analyst, 1910, 238.

Iodoform—Dimorphism.—The usual crystalline form of iodoform is hexagonal, and its melting-point 119° B. Bardach, however, states that a different form, in acicular or thread-like crystals, and melting at 121° C. can be obtained in several ways, the following being among the best: (1) A mixture is made of 20 Cc. of 2 per cent. solution of melilotic acid and 1½ Cc. of 0.5 per cent. solution of acetone, then 5 Cc. of Lugol's solution (iodine in potassium iodide) and 10 Cc. of 10 per cent. ammonia solution are added; a deep brown color is produced, gradually changing to green, and after five to six hours bright yellow hair-like needles of iodoform are found to have formed. (2) An alcoholic solution of iodoform is added to a solution of euxanthic acid, when acicular crystals of the former separate (3) 0.1 Gm. of coumarin is dissolved in 3 Cc. of alcohol by aid of heat

and added to 97 Cc. of warm water; after cooling, 4 Cc. of iodine-potassium-iodide solution and 6 Cc. of 10 per cent. ammonia are added, and the mixture filtered after one hour; to the clear yellowish-green filtrate a 2 per cent. alcoholic solution of iodoform is added drop by drop, with stirring, when the needles separate in considerable quantity. This form of iodoform changes into the usual hexagonal form, of melting-point 119° C., on crystallizing from alcohol or distilling with steam; analysis showed the needles to consist of practically pure iodoform.—Pharm. Journ. and Pharmacist, April 15, 1911, 499; from Chem. Ztg., Jan. 9, 1911, 11.

Iodoform—Assay in Substance and in Gauze.—A. H. Clark recommends the following process for the assay of iodoform: The iodoform (0.75 Gm. or less) is added to 50 Cc. of $\frac{N}{10}$ silver nitrate V. S., to which 3 Cc. of nitric acid, U. S. P., has been added in a 250-Cc. flask; 50 Cc. of alcohol is added, and the mixture gently boiled under a reflux condenser—this being best conducted in a water-bath reaching to the level of the contents in the flask. The heat is continued one-half hour after boiling commences. The contents are then allowed to cool, water is added to make the volume up to about 150 Cc., followed by a little ferric ammonium sulphate T.S., and the excess of silver nitrate V.S. determined with potassium sulphocyanide V.S.—each Cc. of $\frac{N}{10}$ silver nitrate V.S. consumed being equivalent to 0.0130 Gm. iodoform.

To assay the gauze, it is extracted with alcohol in a small (60 Cc.) Soxhlet, in which the usual wide-mouthed extraction flask is replaced by a 250-Cc. florence flask, containing the silver nitrate V.S. and nitric acid in the same quantities as in the above-described assay. After an hour's extraction, the florence flask is disconnected and its contents treated precisely as in the preceding experiment.—Amer. Journ. Pharm., Oct., 1910, 451–453.

Iodoform—Removal of Odor from the Hands.—P. S. Minton says, to remove the odor of iodoform from the hands, wet them with water, then apply a small quantity of potassium carbonate and two or three drops of ammonia water. The odor will entirely disappear.—Bull. Pharm., October, 1910, 431.

Paraldehyde, G. P., V.—Contradictory Requirements.—R. Richter points out that while the new German Pharmacopœia admits the presence of 4 per cent. of acetaldehyde in paraldehyde, which must be otherwise free from contaminants, the constants and tests given apply to pure paraldehyde. Thus the specific gravity at 15° C. is given at 0.998–1000, the boiling point at 123°–125° C., while the congealing point has been lowered (from the melting point 10.5° C. given in the G. P., IV) to 6.5° C. The author finds, however, that otherwise pure paraldehyde, containing 4 per cent. of acetaldehyde, has a specific gravity at 15° C. of 0.993, this being due to the much lower specific gravity (0.7876) of the contaminant, and

that, although the congealing point of such a mixture is 6.5° C., on distillation about 54 per cent. distils over before the temperature has risen to 122.7° C., the remainder (46 per cent.) passing over between 122.7° C. and 124.2° C. It is somewhat problematic whether it is the pharmacopœial intent that paraldehyde *shall* or that it *may* contain 4 per cent. of acetaldehyde, but the author can see no reason for its presence, since it can easily be removed from the commercial product by fractionation. Indeed, he is of the opinion that its presence is liable to produce untoward by-effects, this opinion being warranted by his experience in the treatment of the insane with paraldehyde in a prominent German asylum. He therefore concludes that acetaldehyde should be excluded from paraldehyde as far as possible by observing the following requirement: (1) Specific gravity as high as possible, preferably within the limits of the G. P., V. (2) Boiling point conforming practically with the G. P., V. (3) Congealing point from 10° to 12° C. (4) Quantitative determination of *metaldehyde*, which is always liable to be formed during the spontaneous conversion of paraldehyde into acetaldehyde. This is accomplished by evaporating 10 Gm. of the paraldehyde at a low temperature. In all other respects the tests of the G. P. V., will suffice.—Pharm. Ztg., lvi (1911), No. 53, 536–538.

Hydrated Chloral—Precautions Necessary in the Fr. Phar. Test.—L. Bourde. draws attention to the fact that, when the method of the French Pharmacopœia is used in testing hydrated chloral, the distilled water employed must recently have been freed from carbon dioxide and cooled. Commercial distilled waters obtained by continuous acting stills, contain appreciable quantities of carbon dioxide. Also, a water, which was free from the gas at the time of manufacture gradually absorbs the gas. If this proposed precaution is not taken, the method of the French Pharmacopœia gives values that are too high. At the same time, the author advocates the use of $\frac{N}{2}$ soda solution instead of the normal, and the time of contact of alkaline solution with the chloral solution should be reduced to a quarter of an hour. In this time, the action is complete and the decomposing action of the water on the chloral is in a measure reduced.—Pharm. Journ. and Pharmacist, July 22, 1911, 101; from Journ. de Pharm. et Chim., July 1, 1911, 13.

Tetranitromethane—Preparation and Properties.—According to E. Berger, tetranitromethane can be obtained by the nitration of acetic anhyhride if the reaction is not allowed to proceed too quickly, the temperature does not exceed 70°, and the reagents are used in the proportion of 160 Gms. of pure nitric acid, 100 Gms. of crystallized acetic acid, and 290 Gms. of acetic anhydride. The density of tetranitromethane is 1.620 at 22°. It distils at 124–125° under 750 Mm. pressure, decomposing very slightly with production of nitrous vapors, and at 21–23° under 22 Mm. pressure without decomposition. Its boiling-point under

22 Mm. pressure is 45–47°. When reduced by aluminium amalgam in a neutral medium it yields the same products as in an acid medium—nitrogen, ammonia, and methylamine, but no polyamine. Its heat of formation from its elements is 4.7 cals.—Chem. News, Jan. 6, 1911, 12; from Compt. rend., *151* (1910), No. 19.

Acetone — Quantitative Estimation in Methyl Alcohol.—Bernard O. Leubner recommends the following simple and rapid method for the quantitative estimation of acetone in methyl alcohol, which he has found to give very satisfactory results. A sample containing 1 per cent. acetone was titrated thus: 1 Cc. or 8 Gm. of the spirit mixed with 10 Cc. of seminormal sodium hydroxide and 12 Cc. of decinormal iodine gradually added was, after shaking, allowed to stand a few minutes. The excess of iodine was then liberated with hydrochloric acid, and an excess (9 Cc.) of decinormal hydrochlorite solution added; after several minutes this was titrated back with decinormal iodine solution, using 5.3 Cc.; hence a total of 8.3 Cc. of iodine solution were required, showing the presence of 1.002 per cent. of acetone. The results obtained by adding an excess of thiosulphate solution were almost identical with the results obtained by direct titration.—Merck's Rep., July, 1910, 186–188.

Wood Alcohol—Misuse and Precautions—In concluding a paper on the misuse and consequent danger of wood alcohol, Otto Raubenheimer suggests: (1) Discouraging the use of the title "wood alcohol" and favoring the title "wood naphtha"; (2) condemning the use of the poisonous distillate in any preparation for external or internal use; (3) taking proper steps towards this in the legislation.—Proc. N. Y. State Pharm. Assoc., 1911, 278–272.

Methyl Alcohol—Its Identification in Ethyl Alcohol.—A critical review of methods appearing in the literature is the subject of a paper by H. Engelhart and H. W. Jones, which appears in "Proceedings," 1910, 1053–1058.

Methyl Bromide—Preparation.—A. Bygdén recommends the following process for making methyl bromide: To 600 Gm. concentrated sulphuric acid, in a flask of about 1.5 liters capacity, 450 Gm. of methyl alcohol is added in small proportions at a time, with shaking and cooling. After cooling the mixture, which assumes a brownish-yellow color with a green fluorescence, there are added gradually 230 Gm. of water, and finally 300 Gm. of potassium bromide. The flask, provided with an upright condenser, is then placed in a sand or asbestos bath and heated. The vapor of methyl bromide, which distils over, is condensed in a cooled receiver, the heating being continued until the gas evolution practically stops. The yield is 200–203 Gm. or 83–84 per cent. of the theoretical. The purity of the product, when obtained under the conditions specified, is in every way satisfactory. The substance boils between 4.0° and 4.2 at 747 Mm.—

Pharm. Journ. and Pharmacist, Oct. 28, 1911, 561 ; from Journ. f. prakt. Chem., 1911, No. 8 and 9.

Nitrodimethylene—Pharmacological Action.—G. Piantoni discusses the pharmacology of nitrodimethylene, a strong-smelling colorless liquid boiling at 180° C. It is slightly inflammable, but is not explosive. From its action on frogs, guinea-pigs, and rabbits it appears to be markedly less toxic than nitroglycerin. A 1 :100 aqueous solution at first accelerates, then retards, the respiratory movements. It directly lessens the arterial pressure, dilates the vessels, increases the number of pulsations, but has no action whatever on the cardiac muscle. Nitroglycerin, on the contrary, has a paralysant and convulsive action.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 625 ; from Archiv. Farmacol., *9* (1911). 495, through Nouv. Remédes, *28* (1911), 415.

Formaldehyde—Supposed Formation by Heat Upon Sugar.—The question of the production of formaldehyde by boiling sugar solutions has recently occupied the attention of a number of investigators. Doubting its production from sugar under the conditions mentioned, H. B. Mead adopted the suggestion made by Charles H. LaWall to subject cane sugar to the most severe treatment, even to the point of destroying it, and examine the resulting products for formaldehyde. The conclusion drawn from his experiments, which are described in brevity, is obviously that formaldehyde is *not* produced when sugar is heated.—Proc. Pa. Pharm. Assoc., 1911, 511–512.

Formaldehyde—KCN Method of Assay Proposed by the U. S. P.—After an experimental study of the different methods in use and proposed for the assay of formaldehyde, Elias Elvove proposes the reduction in the pharmacopœial strength of the solution to a minimum of 36 per cent. by weight of absolute formaldehyde, thereby bringing the official requirement more in harmony with other pharmacopœias, as well as the actual condition of the American market, and also suggests that the KCN method might with advantage be substituted for the present H_2O_2 method of assaying formaldehyde. The KCN method applied to U. S. P. solution of formaldehyde may be carried out as follows : Transfer 0.5 Cc. of the sample to a well-stoppered Erlenmeyer flask of about 150 Cc. capacity and determine its weight. Add to it immediately 100 Cc. of a solution of potassium cyanide of a strength close to tenth-normal (6.5 KCN to 1000 Cc.), the exact strength of which is known. Mix well, and add to a mixture of 40 Cc. $\frac{N}{10}$ silver nitrate and 10 Cc. of dilute (10 per cent.) nitric acid, in a 200-Cc. measuring flask. Wash the Erlenmeyer flask, adding the washings to the silver solution, and make up the whole to 200 Cc. Shake thoroughly, filter through a dry filter, and titrate the excess of silver in 100 Cc. of the filtrate by means of $\frac{N}{10}$ ammonium or potassium sulphocyanate, using ferric alum as indicator. The number of Cc. of $\frac{N}{10}$ sulphocyanate found to re-

quire, multiplied by 2, and the product subtracted from 40, will give the equivalent of the uncombined KCN in Cc. of $\frac{N}{10}AgNO_3$. Subtracting this from the corresponding equivalent of the total KCN added, multiplying the difference by 0.3, and dividing this product by the weight of the sample taken, the quotient will represent the percentage by weight of absolute formaldehyde in the sample.—Amer. Journ. Pharm., October, 1911, 455–471.

Formaldehyde—Correction of the G. P. Method of Estimation.—The method of determining the strength of formaldehyde solution which has been adopted in the new German Pharmacopœia, by adding sodium sulphite and phenolphthalein and titrating with standard acid, depends on the reaction represented by the equation $HCHO + Na_2SO_2 + H_2O = HCHO.NaHSO_3 + NaOH$. Pure sodium sulphite is neutral to phenolphthalein, but the commercial salt always contains a little alkali. This may be corrected according to H. Wastenson by exactly neutralizing the sodium sulphite with sodium bisulphite before adding the formaldehyde, or by a separate determination of the amount of acid required to neutralize a quantity of sulphite equal to that used. In the German Pharmacopœia 50 Cc. of sulphite solution is used, but the correction is obtained by finding how much acid is required to neutralize only 12 Cc. of the same. This is not enough, and the results obtained are therefore a little too high. On the whole the author considers the iodine method of Romijn's adopted in the Pharm. Helv., as being the simplest and most reliable.—Apoth. Ztg., xxvi (1911), No. 67, 706.

Formaldehyde Solutions—Simple Method of Valuation.—W. Braeutigam recommends the following simple method for the valuation of formaldehyde solutions, which is based on the reactions which take place between calcium hypochlorite and formaldehyde, resulting in the ultimate formation of calcium carbonate, one molecule of which is equivalent to one molecule of formaldehyde: About 300 Cc. of freshly prepared chlorinated lime solution is treated with 10 Gm. of a 1:10 dilution of the formaldehyde solution to be tested, and set aside in a loosely-stoppered flask; at normal temperature and under the influence of daylight, reaction speedily takes place, as indicated by the appearance of precipitate. When this is complete the supernatant liquid will be clear. The calcium carbonate is then collected on a tared filter, and the filtrate is heated to boiling to ensure completion of the reaction. Should any further precipitate be formed, this should be added to that first collected. The whole is then washed free from chlorides, dried at 100° C., and weighed. Each 1 Gm. of calcium carbonate so obtained is equivalent to 0.3 Gm. of formaldehyde. Good commercial formaldehyde solutions were found to give from 1.15 to 1.2 Gm. of calcium carbonate, equivalent to 35 to 36 per cent. of formaldehyde, when treated by this method.—Pharm. Zentralh., *51* (1910), No. 40, 916.

Formaldehyde—Simple Method of Determination.—One of the earliest methods proposed for the quantitative determination of formaldehyde was that proposed by Legei (1883), which was based upon its conversion into hexamethylene-tetramine by the action of ammonia, but this method was rejected by Fresenius and Grünhut, principally on account of the disadvantages of working with a standard ammonia solution, the titer of which is so prone to alteration. Another objection is that the reaction between formaldehyde and ammonia at ordinary temperatures only becomes complete after the lapse of some time. F. Herrmann has now experimented with the object of utilizing this reaction, by using ammonium chloride and standard solution of soda instead of solution of ammonia, and he recommends that the test be carried out as follows:—From 4 to 4½ Gms. of the solution of formaldehyde (if about 40 per cent.) is accurately measured or weighed into a stoppered flask of 150 to 200 Cc. capacity, about 3 Gms. of pure ammonium chloride in fine powder is added, and then 25 Cc. of a double normal solution of caustic soda, the flask being shaken meanwhile. A good deal of heat is produced, and the stoppered flask is allowed to stand until flask and contents are at the temperature of the room. Then 50 Cc. of water containing 4 drops of 1 per cent. solution of methyl orange is added and the liquid titrated with normal sulphuric acid until the yellow color just changes to red. The number of Cc. of normal soda used up multiplied by 0.06 gives the weight of formaldehyde. If the solution was acid another portion is titrated with $\frac{N}{10}$ alkali and phenolphthalein, and the necessary correction made in the amount of soda neutralized. A number of experiments showed that this method gave very constant results.—Pharm. Journ. and Pharmacist, April 1, 1911, 433; from Chem. Ztg., Jan. 1911, 25.

Formaldehyde—Determination of Small Quantities.—P. A. Yoder and W. G. Taggart found the following modification of a method often employed in testing milk, very serviceable for the determination of small amounts of formaldehyde in sugar solutions: The liquid to be tested was acidified with phosphoric acid and heated in a bath of boiling saturated solution of common salt, and superheated steam passed through it, the temperature of the steam being so adjusted that the volume of liquid remained practically unchanged; 5 Cc. of the distillate was mixed with 5 Cc. of a freshly-prepared 1 per-cent. peptone solution and 10 Cc. of strong hydrochloric acid containing 1 part of ferric chloride in 5000; the mixture was heated for five minutes in a water-bath at 82.5° C. and then cooled, and the color compared with that given by known amounts of formaldehyde when treated in the same way. Satisfactory results were obtained when the distillate contained from 1 of formaldehyde in 100,000 to 1 in 1,000,000: if more than 1 in 100,000 was present the depth of color was no longer proportional to the strength, but the color was purple-red

instead of violet, and it was necessary to dilute the distillate before adding the reagents. Less than 1 in 1,000,000 in the distillate could not be accurately estimated in this way; the reagents alone gave a tinge of color corresponding to about 1 in 5,000,000. Many other substances besides formaldehyde were tested in the same way, including other aldehydes, sugar, the commoner alcohols, some acids, furfurol, etc.; the violet color was only given by ether and glycolic acid, and since ether after very thorough washing no longer gave it, it was apparently due to traces of formaldehyde in the ether, and it is probable that the color given by glycolic acid was due to a similar cause.—Pharm. Journ. and Pharmacist, Nov. 26, 1910, 637; from Zschr. f. Unters. d. Nahr. u. Genussm., Aug. 15, 1910, 208.

Formaldehyde—Estimation in Soaps.—O. Allemann finds that Romijn's iodometric method, and the permanganate method of Vanino and Seitter, give very concordant results in estimating the formaldehyde soaps. Direct estimation, however, cannot be made on account of the influence of the soap, which should, therefore, be removed by means of sulphuric acid and barium chloride; the filtrate is used for titration. A standard formaldehyde soap solution is made thus:—10 Cc. of a 20 per cent. potash soap solution is treated with 25 Cc. of a 0.8646 per cent. formaldehyde solution; the soap-precipitating reagent is then added in slight excess, and, finally, the whole made up to 100 Cc. with water. Shake, allow to stand and filter. Twenty Cc. of the clear filtrate corresponding to 5 Cc. of formaldehyde solution is then titrated as in the iodometric method. In treating soaps, 50 Cc. of the solution is diluted with four or five times its volume of water. The precipitating reagent is next added in slight excess, and water to 500 Cc. After settling, 5 Cc. is treated with 40 Cc. of decinormal iodine, then some caustic soda is run in until a bright yellow color is obtained. Allow to stand for ten minutes, acidify with sulphuric or hydrochloric acid, and titrate the excess of iodine with decinormal sodium thiosulphate.—Pharm. Journ. and Pharmacist, Nov. 5, 1910, 551; from Zschr. f. Anal. Chem., 1910, *5*, 265.

Formamine-Resorcin—Preparation, Properties and Tests of Identity.—According to G. Mossler, formamine-resorcin (hexamethyleneamine-resorcin), $(CH_2)_6N_4.C_6H_4(OH)_2$, which is chemically identical with *hetraline*, is obtained on mixing strong aqueous solutions of molecular equivalents of hexamethylenetetramine and resorcin and allowing to crystallize. It occurs as colorless or slightly yellowish-red needle-shaped crystals, having a sweetish taste and a faint creosote-like odor. Soluble in cold water (1 in 14), more so in hot water (1 in 4), difficultly in alcohol and chloroform, and almost insoluble in ether; the aqueous solution has a slight alkaline reaction, and on long standing becomes decomposed and dark-colored. When the substance is heated it begins to decompose at about 150° C. and

becomes brown. The following tests serve for its identification: The aqueous solution gives a white precipitate with lead acetate, and a red color when warmed with a little dilute nitric acid; if 0.1 Gm. of the substance is heated with 2 or 3 Cc. of caustic soda and 3 drops of chloroform, a deep red color is produced; when heated with dilute hydrochloric acid, formaldehyde is evolved, and on then adding excess of alkali and heating, ammonia is obtained. To ascertain its composition, 1 Gm. is dissolved in 25 to 40 Cc. of water, the solution acidified with sulphuric acid and shaken out three times with 10 Cc. of ether; on evaporation of the ether the residue, dried at 100° C. until constant, should weigh not much more or less than 0.44 Gm., and should possess the melting-point and show the reactions of resorcin. Formamine-resorcin should not be kept exposed to light.—Pharm. Journ. and Pharmacist, Aug. 13, 1910, 235; from Zschr. d. Allgem. Oesterr. Apoth. Verein., 1910, 181.

Pyrogallol Dimethyl Ether—A Delicate Reagent for Chromic Acid, Ferric Salts, and Nitrous Acid.—J. Meyerfeld finds that an aqueous solution of pyrogallol dimethyl ether gives a red or yellow color with certain oxidizing substances, for which it affords a delicate test. The pure ether is a colorless crystalline substance of melting point 51°–52°, soluble to the extent of about 2 per cent. in water. If 0.1 Cc. of $\frac{N}{10}$ bichromate solution is diluted to 1 litre, 10 Cc. of this acidified with sulphuric acid give at once a yellowish-red color on adding 1 Cc. of the pyrogallol ether solution; this quantity contains only $\frac{1}{200.000}$ Gm. of $K_2Cr_2O_7$. For even more dilute solutions, a little chloroform is shaken up with the aqueous liquid, when the yellow color is taken up by the chloroform, and very small traces may thus be observed. The most delicate test hitherto for chromic acid has been the addition of hydrogen peroxide and shaking with ether; but while the limit of this is reached when $\frac{1}{25}$ Mgm. of CrO_3 is present, the test just described will detect as little from $\frac{1}{500}$ to $\frac{1}{1.000}$ Mgm. For ferric salts the test has about the same delicacy as the sulphocyanide test. Nitrous acid is detected if present to the extent of $\frac{8}{1.000}$ Mgm. of KNO_2 in 5 Cc., at which dilution it is also shown by the iodide and starch test. Solutions of chlorine, bromine, of permanganate diluted until colorless, give a yellow color with this reagent; nitric acid and hydrogen peroxide when highly diluted do not give a color with it. The solution of pyrogallol dimethyl ether must be freshly prepared, as after a few hours' keeping, even in the dark, it becomes colored, perhaps on account of a trace of iron derived from the glass.—Pharm. Journ. and Pharmacist, Nov. 26, 1910, 637: from Chem. Ztg., Sept. 8, 1910, 948.

Salicylaldehyde-methylphenylhydrazone—Preparation and Properties.—This compound, which is chemically identical with "agathin," is obtained, according to K. Schuster, by mixing at the ordinary temperature molecular

equivalents of asymmetrical methyl-phenylhydrazine and salicylic aldehyde; the mass becomes warm and water is spilt off. After standing for some hours the product is crystallized from hot alcohol. The compound occurs as almost white crystalline laminæ with a greenish tinge, having no odor or taste, almost insoluble in water, fairly soluble in alcohol, easily in chloroform, ether and benzol; melting point, 74° C. It may be identified by the following tests: 0.1 Gm. heated carefully with 1 Gm. of caustic potash is decomposed, and salicylic acid may be obtained by dissolving the mass in water, acidifying, and shaking out with ether. If 0.1 Gm. is decomposed by means of 1 Cc. of strong hydrochloric acid, an orange-yellow precipitate is produced which dissolves on warming to a yellowish-red solution, having the characteristic smell of phenylhydrazine, and salicylic acid can be extracted from the liquid with ether; or, if the liquid is made alkaline with caustic soda and a little Nessler's solution added, a gray precipitate falls, due to reduction of the Nessler's solution by phenylhydrazine. A solution of 0.03 Gm. of the substance in 2 or 3 Cc. of sulphuric acid is brownish-yellow; if a trace of strong nitric acid is then added, the color changes to blue and green; on long standing the yellow color reappears and is not altered by further addition of nitric acid. If a little agathin is moistened with nitric acid, nitric oxide is evolved, and the mixture becomes blue and then quickly green, with partial charring; if water is added immediately, an olive-green precipitate forms, but if the water is only added after some time the precipitate is brown. Agathin should be free from chloride and sulphate and should leave no ash when ignited. Absence of free salicylic acid is shown by adding ferric chloride to an alcoholic solution, or to water which has been shaken with the substance, when no violet color should be produced.—Pharm. Journ. and Pharmacist, Nov. 4, 1911, 593; from Ztschr. d. Allgem. Oesterr. Apoth. Verein, Aug. 19, 1911, 337.

Aldehyde Hydrazine—Preparation and Properties.—According to R. Stollé, the addition of one molecule of hydrazine hydrate to one molecule of acetaldehyde in a little alcohol gives colorless crystals of aldehyde hydrazine, analogous to aldehyde ammonia. It melts at 60° C., and is readily soluble in cold alcohol and water, and slightly soluble in ether and benzene. The faintly acid aqueous solution gives benzalazine when shaken with benzaldehyde. Aldehyde hydrazine is stable towards alkalies. No sodazide is formed when the alcoholic solution is heated with amyl nitrite and sodium ethylate. With silver nitrite in aqueous alcoholic solution it gives a white unstable precipitate of the silver nitrate double compound $C_6H_{18}N_6.3AgNO_3$, which apparently contains some water. On warming reduction occurs.—Chem. News, July 28, 1911, 48; from Ber. d. D. Chem. Ges., *43* (1911). No. 8.

Butyl and Amyl Alcohols—Estimation in Alcoholic Liquids.—A. Las-

serre gives the particulars of his objections to the methods of Allen-Marquardt and Mann and Stercy, for the estimation of butyl and amyl alcohols in alcoholic liquids, and proposes the following: Place 100 Cc. of the alcohol to be examined in a liter decanting vessel; add 60 to 70 Cc. of carbon disulphide, then 450 Cc. of saturated brine and enough water to redissolve the salt which is precipitated (about 50 Cc.); shake vigorously for five minutes, then allow to rest; draw off the carbon disulphide into a stoppered 300-Cc. separator, avoiding the introduction of water; make two further extractions and unite the carbon disulphide liquids to the first; shake the carbon disulphide liquid with sufficient concentrated sulphuric acid to form a layer at the bottom after agitation (2 to 3 Cc. generally suffice); allow to settle and draw off the acid into a flask marked at 100 Cc.; wash the disulphide twice with 1 Cc. of sulphuric acid and unite the acid liquids; drive off the residual disulphide; add carefully 20 Cc. of boiling water to liberate the higher alcohols; cool to ordinary temperature and add 5 Cm. potassium dichromate and 1 Cc. of H_2SO_4. Cork securely at once and place in the oven at 50° C. for one hour, shaking frequently; cool and make up to volume; separate 25 Cc. of the liquid and shake it for two or three minutes with 30 Cc. of benzine; allow to settle, separate the solvent and filter through a small filter previously moistened with benzine; the benzine collected is added to an equal volume of neutralized alcohol and saturated with $\frac{N}{20}$ alcoholic potash in presence of phenolphthalein. If n represents the volume of alkaline solution used, then for 100 Cc. of the sample taken $n \times 4 \times 2.082$, 2.082 being the product of the total quantity of butyric and valeric acids in the quantity of these acids taken up by the benzine. The value obtained is rendered into terms of amyl alcohol. The butyl and amyl alcohols may be estimated separately by a process described by the author in "Annales de l'Institut Pasteur," October, 1907.—Pharm. Journ. and Pharmacist, Nov. 19, 1910, 609; from Ann. de Chim. Analyt., Sept. 15, 1910, 338.

Amylene-chloral—Preparation, Properties and Tests.—According to G. Mossler, amylene-chloral, which is chemically identical with "Dormiol," has the composition $CCl_3.CH(OH).OC_5H_{11}$, and may be prepared by simply mixing 100 parts of anhydrous chloral with 60 parts of amylene hydrate. It is a colorless oily liquid with camphoraceous odor and burning taste, slowly forming a clear solution with an equal measure of water, soluble at once in larger quantities of water and freely miscible with alcohol, ether, and fixed oils; specific gravity 1.24; boiling point 93°, with decomposition; solidifying point about —5; it is decomposed when its aqueous solution is boiled. If 0.5 Gm. is heated with 4 or 5 Cc. of caustic alkali, it is decomposed; chloroform may be recognized by applying the carbylamine test to a part of the liquid, and on adding to the remainder a 1 in 10 solution of resorcinol, a reddish precipitate is at first formed and then a red liquid. If 1 drop is dissolved in 10 Cc. of water

and Nessler's solution added, a reddish-brown precipitate is formed which becomes green on standing, or more quickly on heating. Amylene-chloral should have no reducing action on ammoniacal silver nitrate solution on standing, showing absence of free chloral. The maximum dose as a hypnotic is 3.0 Gms.—Pharm. Journ. and Pharmacist, Sept. 24, 1910, 392; from Zschr. d. allgem. œsterr. Apoth. Verein., July 23, 1910, 302.

a-Bromocrotonic Aldehyde—Preparation and Properties.—P. L. Vigueir describes the preparation and chemical properties of *a*-Bromocrotonic aldehyde, as follows:—Crotonic aldehyde is cooled in a mixture of ice and salt, bromine is added, and the dibromobutyric aldehyde obtained is treated with sodium acetate solution at 150—170°. The product is then distilled in a current of steam. Above 50° bromocrotonic aldehyde passes over, and although the yield is low and the product not very pure this method has the advantage of being very rapid. The bromocrotonic aldehyde thus prepared is the *a* substance. It condenses with malonic acid to give bromosorbic acid, and with hydrocyanic acid to give bromangelactic acid.—Chem. News, Aug. 5, 1910, 71; from Compt. rend., *150* (1910), No. 22.

Phenol—Simple Method of Determination of the G. P., V.—F. Lehmann directs attention to the method of the G. P., V. for determining phenol, which satisfactorily corrects certain errors in the "tribromide" method formerly official. The process consists in adding to a solution containing phenol known quantities of solutions of potassium bromide and bromate, acidifying with sulphuric acid, and shaking in a stoppered flask; after fifteen minutes' standing the excess of bromine is determined by adding potassium iodide and titrating with thiosulphate. If the bromate solution is made to contain 1.6702 Gm. of $KBrO_3$ in 1 liter, 50 Cc. = 30 Cc. of $\frac{N}{10}$ thiosulphate; if therefore 50 Cc. of the bromate solution is employed in a given case, the number of Cc. of thiosulphate used is to be deducted from 30, and the difference multiplied by 0.001567 gives the weight of phenol precipitated.—Apoth. Ztg., xxvi (1911), No. 6, 55.

Creosote and Guaiacol Carbonates—Method of Identification.—According to A. Fernan, the following method, which is an almost quantitative one, for the separation of creosote from the carbonate is recommended: Ten Gm. of creosote carbonate is dissolved in about 30 Gm. of alcoholic potash solution in a porcelain dish of about 100 Cc. capacity, and evaporated with constant stirring on a water-bath to about 15 Gm. The alcoholic potash used was of 10 per cent. strength with absolute alcohol. The product is made acid with dilute hydrochloric acid, whereupon the creosote separates as an oily liquid. The contents of the porcelain dish are now poured into a graduated 100-Cc. cylinder, diluting the aqueous layer to about 60 Cc., adding 5 to 10 Gm. of common salt, and shaking. The creosote layer, which soon separates, is then measured. Should the creo-

sote layer not separate sharply, the cylinder should be placed in hot water. From 10 Gm. of creosote carbonate about 9 Cc. of creosote is obtained, a quantity which is sufficient for identification purposes. The same procedure serves for guaiacol carbonate.—Pharm. Journ. and Pharmacist, June 17, 1911, 809, from Ztschr. d. Allgem. Oesterr. Apoth. Ver., April 15, 1911, 165.

Phenol—Compounds with Camphor.—When a small amount of camphor is added to phenol, the mixture assumes the liquid state, and remains in that condition even when cooled to temperatures considerably below the freezing-point of phenol. By taking the freezing-point curve for mixtures of the two-bodies, J. C. Wood and J. D. Scott have been able to confirm the statement of Léger as to the existence of a mono-camphoride of phenol. The two substances are united in equimolecular proportions, and the freezing-point of the compound is about 18.6°. When the two components are not present in equimolecular proportions, the freezing point of the mixture is lower than that of the pure compound, and falls according as to whether it is phenol or camphor which is in excess. No indication was obtained by the authors as to the existence of a compound formed by the union of two molecules of phenol with one of camphor, as was stated to be the case by Léger.—Pharm. Journ. and Pharmacist, Nov. 12, 1910, 577; from Journ. Chem. Soc., Aug. 1910, 1572.

Thiophene—Preparation.—W. Steinkopf has succeeded is obtaining a 40 per cent. yield of thiophene by passing acetylene over pyrites heated only to 300° C. The distillate contains not only thiophene, but other sulphur compounds, of which one, boiling at 36° to 38°, appears to have the composition $C_4H_6S_3$. The higher fractions contain substances which cannot be distilled without decomposition, even under greatly reduced pressure. Benzene cannot be detected in the distillate, a fact which suggests that the condensation of acetylene to benzene proceeds in two stages, an unsaturated residue —CH = CH — CH = CH— being the initial product, which, in presence of sulphur, gives thiophene, and only adds another molecule of acetylene to yield benzene when sulphur is absent. Ordinary sulphide of iron cannot be used to replace the pyrites —Pharmacist, Nov. 2, 1911, 711; from Chem. Trade Journ., Oct. 21, 1911, 394.

Glycerin — Tests of the G. P. V.—In a review of the tests prescribed in the G. P. V. to determine the purity of glycerin, O. Heller calls attention to the contradiction in the statement that glycerin in large bulk may have a faintly perceptible, peculiar odor, but that when a few grammes of glycerin is rubbed between the hands no odor should be perceptible. The author maintains that the latter is a far more delicate test for odor, which is more perceptible than when smelling the glycerin in large bulk. The

tests for free chlorine, and the quantitative tests for fatty acids are regarded as superfluous.—Pharm. Ztg., lvi (1911), No. 11, 106.

Glycerin—Method of Estimation in Wines.—C. Beys, recognizing the difficulty of obtaining concordant results by the methods of estimating glycerin in wines in common use, proposes the following process, which has been controlled by synthetic mixtures and has given satisfactory results: Fifty Cc. of the wine, or only 25 Cc. if the wine is below 5° B., is neutralized by baryta water and is concentrated in a porcelain dish at a temperature not above 70° C., until it is syrupy, when sand is added. The mixture is heated on a water-bath, below 56°, with 40–50 Cc. of acetone, cooled and filtered. The operation is repeated with less acetone until 200 Cc. of filtrate have been obtained. Two aliquot parts of the product are evaporated, without boiling. In one of the residues the sugars are estimated by means of Fehling's solution. The other residue is dissolved in five times its weight of water and treated with sufficient powdered barium hydroxide to equal four-fifths of the invert sugar contained in the residue. After half an hour's contact and intermittent agitation a little sand is mixed with it and the glycerin extracted by acetone, which is done by heating it four times with 15 Cc. of acetone without boiling. It is then filtered, evaporated below 56°, dried for an hour in an oven between 60° and 65° C., and weighed. If the wine contains less than 5 per cent. of sugar, the first extraction need not be made; the residue of evaporation previously neutralized is mixed directly with the necessary baryta, and the process carried out as detailed. The glycerin obtained contains about 5 Mgms. of foreign matter, but that is nearly balanced by the loss during evaporation, etc.—Pharm. Journ. and Pharmacist, Oct. 15, 1910, 465; from Compt. rend., July 4, 1910, 80.

Glycerin—New Method of Determination in Wine.—S. Rothenfusser has found it possible to obtain directly from wine a liquid which is free from sugars, acids, and other substances which are capable of yielding oxalic acid when treated in strong alkali carbonate solution with permanganate. This is effected by a process of precipitation by means of tin, lead and ammonia, involving two filtrations; the final filtrate is then oxidized with permanganate, first in alkali carbonate solution and then in acid solution. A glycerin determination can be carried out in this way in 2½ hours; the results obtained with artificial wines containing known quantities of glycerin were very good.—Pharm. Journ. and Pharmacist, Nov. 18, 1911, 667; from Chem. Ztg., Oct. 3, 1911, 1101.

Nitroglycerin—Estimation of Minute Quantities.—Wilbur L. Scoville, calling attention to the importance of accurately determining the strength of medicinal preparations of nitroglycerin, and the difficulties attending such estimations, observes that for pharmaceutical purposes nitroglycerin is obtained in 10 per cent. alcoholic solution, which is practically a satu-

rated solution, or in about 20 per cent. admixture with absorbent powders, as sugar of milk, chalk, talc, etc., to which a little sodium bicarbonate or magnesium carbonate has been added for safety in shipping. Both these preparations deteriorate slowly. In cold weather a portion of the nitroglycerin will separate from the alcoholic solution, leaving the liquid weak, unless the precaution be taken to warm and dissolve; also there is loss in manufacturing tablets. The nitrometer and the saponification methods of estimation are both condemned. The author gets accurate results, however, by the use of phenol disulphonic acid as in water analysis—a colorimetric method. The standard solution of potassium nitrate is used as a standard. It is made by dissolving 0.722 (0.7217) Gm. of pure fused potassium nitrate in sufficient water to make 1000 Cc. One Cc. of this solution contains 0.0001 Gm. of nitrogen in the form of nitrate, and 1.2 Cc. of this solution contains the same amount of nitrogen as $\frac{1}{100}$ grain of pure nitroglycerin. Of the alcoholic solutions, the equivalent of 0.00065 Gm. (or $\frac{1}{100}$ grain) of pure nitroglycerin (calculated) is measured into a small porcelain evaporating dish, and allowed to evaporate spontaneously. Into another dish is measured 1.2 Cc. of the standard nitrate solution, and evaporated at a low temperature. When both are dry, 2 Cc. of the phenol disulphonic acid reagent are added to each, the mixture stirred well with a glass rod and allowed to stand ten minutes, then diluted with water, rendered slightly alkaline with potassium hydroxide, cooled and diluted to 100 Cc.—or 200 Mm. in the comparison tubes. The colors are then compared in a Schreiner colorimeter in the usual way, but Nessler tubes will do. For tablets, five $\frac{1}{100}$-grain tablets are powdered, 10 Cc. of alcohol added, and the mixture shaken freely during one to two hours, then filtered. Two Cc. of the filtrate are then evaporated and treated as above. —Amer. Journ. Pharm., Aug., 1911, 359–364.

Calcium Glycerophosphate—Commercial Quality in France.—A. Astruce finds that the calcium glycerophosphate met with commercially in France at present is not the official mono-glycerophosphate. For the most part it is a mixture of mono- and di-glycerophosphates. The presence in these glycerophosphates of phosphorus compounds other than the official salt is shown by the divergent amounts of lime and of phosphoric acid they contain. But the mere determination of these constituents alone is not enough to establish the identity, or even the purity, of the compound. Neither treating the commercial salt with boiling alcohol, nor precipitating aqueous solution with alcohol, will yield the official glycerophosphate. It may be obtained by warming the aqueous solution to not above 70° C., when it is precipitated. But if this temperature is exceeded, and specially at about 100° C., the precipitate will consist of mono- and di-glycerophosphate. The official salt is perfectly soluble in cold water; its solutions are neutral to phenolphthalein. In its examination it is necessary to look for

citric acid, ammonia, and oxalic acid. Three samples examined by the author were found to contain 10 per cent. of citric acid. The presence of this impurity may be suspected in samples with a markedly acid reaction. The oxalic acid met with is probably not added intentionally, but occurs as an impurity; possibly from the energetic action of the phosphoric acid on the glycerin; only small quantities have been found. The source of ammonia as an impurity is doubtful; it is probably derived from the metaphosphoric acid used. This frequently contains ammonia as an impurity. The moisture should be determined at 150–160° C., and a little more than 12 per cent., or one molecule of water, may be tolerated.—Pharm. Journ. and Pharmacist, July 23, 1910, 97; from Journ. de Pharm. et Chim., 1910, *2*, 11.

FIXED OILS AND FATS.

Fats — Use of Glycerin in Determining Reichert-Meissl Values.— H. Krels observes that the chief objection to the use of glycerin with the alkali in saponifying a fat for determination of the Reichert-Meissl value has hitherto been the great difficulty in obtaining glycerin quite free from volatile fatty acids, even samples supplied by good makers as free from such acids giving an appreciable amount when blank Reichert-Meissl determinations have been made with them. It is now shown by experiments, however, that the amount of glycerin used can be reduced until such impurity becomes unimportant; with butter-fat or coconut oil excellent results were obtained by using 2 Cc. of potash solution (1 to 1 of water) and 2 Cc. of glycerin, to 5 Gm. of the fat. When lard was treated in the same way the mixture in many cases became solid before reaction was complete, so that there was danger of either leaving off heating too soon or burning the material; but by increasing the glycerin to 4 Cc. this difficulty was avoided.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 625; from Chem. Ztg., Sept. 26, 1911, 1053.

Fats and Waxes—Proposed Factors for the B. P.—In order to show the reasonableness of the factors suggested by E. W. Lucas and F. C. J. Bird for the monographs of the B. P. on fixed oils, fats and waxes, a comparison of them with the factors given in Squire's "Companion to the British Pharmacopœia" is shown in the following table. The factors are based on analytical work from year to year in the author's laboratories, and the results are collected with the published observations of other analysts:

Substance.		Squire's "Companion."	Lucas and Bird.
Adeps	M. P.	35° to 45° C.	38° to 41°
	Sapon.-value	192 to 196.5	192 to 197
	Iodine-value	52 to 62	52 to 63
	Free acid	a trace	0.3
	Refract. index	—	1.4530 to 1.4550
Adeps lanæ	M. P.	about 40° C.	about 40° C.
Cera flava	Sp. gr.	about 0.960	0.958 to 0.970
	M. P.	61° to 64° C.	61° to 64° C.
	Acid-value	20.0 to 22	16.7 to 22.3
	Ester-value	68 to 77	69 to 75.7
Cetaceum	Sp. gr.	0.942 to 0.946	0.950 to 0.960
	M. P.	about 48° C.	43° to 50° C.
	Sapon.-value	125 to 136	125 to 136
	Iodine-value	practically nil	3 to 4.4
Almond oil	Sp. gr.	0.915 to 0.920	0.915 to 0.920
	Sapon.-value	190.4 to 196.4	188 to 200
	Iodine-value	95.3 to 100.3	95 to 100
	Free acid	—	not exceeding 2 p. c.
	Refract. index	—	1.472 to 1.473
Linseed oil	Sp. gr.	0.930 to 0.936	0.930 to 0.940
	Sapon.-value	190 to 195	187 to 195
	Iodine-value	170 to 188	170 to 190
	Free acid	A.-value less than 5	not exceeding 1.5 p. c.
	Refract. index	—	1.4832 to 1.4844
	Congeal.-point	−20° C.	not above −20° C.
	Unsap. matter	not more than 2.5 p. c., usually much less	under 1 p. c.
Oleum morrhuæ	Sp. gr.	0 920 to 0.930	0.920 to 0.930
	Free acid	0.0 to 1.0 p. c.	not exceeding 1 p. c.
	Refract. index	—	1.4800 to 1.4830
	Sapon.-value	181.4 to 190.4	179 to 192
	Iodine-value	147.3 to 165.1	155 to 173
	Unsap. matter	1.0 to 1.5 p. c.	not exceeding 1.5 p. c.
Oleum olivæ	Sp. gr.	0.915 to 0.918	0.915 to 0.918
	Free acid	0.0 to 1.4 p. c.	not exceeding 3.5 p. c.
	Refract. index	—	1.4698 to 1.4713
	Sapon.-value	189.7 to 193.3	188 to 197
	Iodine-value	81.28 to 83.82	76 to 87
Oleum ricini	Sp. gr.	0.960 to 0.968	0.958 to 0.970
	Free acid	1.05 to 3.5 p. c.	not exceeding 2 p. c.
	Refract. index	—	1.4790 to 1.4805
	Sapon.-value	176 to 188	177 to 187
	Iodine-value	85 to 90	83 to 89
Oleum theobrom	Sp. gr.	about 0.990	0.900 tc 0.998
	Sapon.-value	188 to 198	188 to 195
	Iodine-value	33 to 37	35.5 to 37.5
	M. P.	31.3° to 33.3° C.	30° to 33° C.
Paraffinum durum	Sp. gr.	0.820 to 0.940	0.820 to 0.940
	M. P.	54 4° to 57.2° C.	54° to 60° C.
Paraffinum liquid	Sp. gr.	0.865 to 0.890	0.860 to 0 885
Paraffinum molle	Sp. gr.	0.840 to 0.870	0.840 to c.870
	M. P.	35.5° to 38.9° C.	36° to 42° C.
Sevum præparat	M. P.	45° to 50° C.	45° to 50° C.
	Sapon.-value	192 to 193	192 to 195
	Iodine-value	33 to 46	33 to 46
	Refract. index at 60° C.	—	1.4491 to 1.4510
	Free acid	A. V.= 0.8 to 2	not exceeding 1 p. c.= A. V. 1.98

—Chem. & Drug, Nov. 26, 1910, 63.

Solid Fats and Waxes—Method of Taking Specific Gravity.—A. Lissner proposes a method for taking the specific gravities of solid fats and wax-like bodies, which is a modification of the combined Hager-Allen method, and is carried out as follows: The substance is melted on a watch-glass over the water-bath, allowed to cool, and small circular pieces are cut out of the congealed mass. These are rubbed with a moistened brush to remove air bubbles, and then transferred by means of a pincette into a glass-stoppered mixing cylinder, containing a mixture of alcohol and water of a density to just float the fat particles upon its surface. Alcohol is now added with continuous shaking until the fat particles just sink to the bottom of the cylinder, whereupon the specific gravity of the fluid is directly ascertained by means of an ærometer. Then water is added with the same care until the fat particles just rise to the surface, and the specific gravity of this alcohol-water mixture is also ascertained. A higher and lower specific gravity are thus ascertained, and the arithmetic medium of the two specific gravities is accepted as that of the fat under examination.

For fats that have a higher specific gravity than water, a mixture of glycerin and water is used in a manner identical with that above-described.—Pharm. Ztg., lv (1910), No. 65, 657; from Chem. Ztg., 1910, No. 74.

Fats, Oils and Waxes—Rapid Determination of Saponification Numbers.—L. W. Winkler finds that in the determination of the saponification values of fats and waxes the alcoholic potash solution may be replaced with advantage by a solution of potassium hydroxide in propyl alcohol. Warm propyl alcohol is a good solvent for fats and waxes, and since it has a higher boiling point than ethyl alcohol the saponification takes place quickly, and a reflux condenser is not required. Butter-fat and beeswax, for example, are completely saponified in ten minutes. The solution is prepared by dissolving a few grammes of potassium hydroxide in a liter of commercial propyl alcohol; setting aside a few days, distilling off the alcohol and dissolving about 30 Gm. of pure potassium hydroxide in the distillate. Even after keeping for a long time the solution becomes only slightly colored. In the determination about 2 Gm. of the fat or wax are dissolved in 25 Cc. of the potassium hydroxide solution in a 100-Cc. flask, and the solution boiled gently on the steam-bath for ten to twenty minutes, the flask being covered with a small inverted beaker. The hot liquid is then titrated back with semi-normal hydrochloric acid. The titer of the potash solution may be found by a blank experiment, but it is not altered by heating for thirty minutes on the steam-bath if a hard-glass flask is used. Propyl alcohol is also recommended as a solvent for beeswax or Japan wax in the determination of the acid number.—Apoth. Ztg., xxvi, (1911), No. 31, 301; from Ztschr. f. angew. Chem., 1911, 636.

Fatty Oils—Determination of Iodine Value by Hübl's Process.—The

G. P. V., describing Hübl's process for determining the iodine value of fixed oils, in full, adds the following statement: "The quantity of iodine must be sufficiently great that after two hours the solution remains dark brown in color. After this time the reaction is complete. For linseed and codliver oils the reaction must be allowed to go on for 18 hours." Ernest J. Parry, however, finds this statement to be untrue, and accounts for differences in his determinations of the iodine values of certain fatty oils from corresponding determinations made on the same sample by Continental chemists, who have recently adopted the custom of returning an iodine absorption after two hours' reaction, whereas at least six hours should be specified for its completion. Mr. Parry has made a number of determinations of the iodine-values of given samples of oil for different times, which show clearly that the absorption is not completed in two hours, therefore that the longer period should always be allowed. The following are the results obtained:

OLIVE OIL (a Non-drying Oil).

No.	2 hours.	3 hours.	4 hours.	5 hours.	6 hours.
I	79	80.5	81.8	82.5	83
II	80.5	82	83	83.6	84.5
III	81	81.5	81.8	82.4	82.9
IV	80.6	81.7	82.4	82.9	82.9

APRICOT-KERNEL OIL (Non-drying Oil).

No.	2 hours.	3 hours.	4 hours.	5 hours.	6 hours.
I	98	99.9	100.4	101.6	102.5
II	100	101	102.3	103	104
III	101.4	102.8	102.8	103.5	104.2
IV	100.8	102	103	103.6	104

CODLIVER OIL (Fish Oil).

No.	4 hours.	8 hours.	12 hours.	18 hours.
I	144	158	163	169
II	146	156	163	168

SESAME OIL (Semi-drying Oil).

No.	2 hours.	4 hours.	6 hours.	8 hours.
I	101	106	108	108
II	100.8	107	109	109.5.
III	100	105.9	108.5	109

LINSEED OIL (Drying Oil).

No.	4 hours.	8 hours.	12 hours.	18 hours.
I	169	178	186	189
II	165	178	183	184
III	170	184	189	190.5

It is to be hoped, therefore, that adequate time will be specified in the description of the iodine-value determinations.—Chem. and Drug., Sept. 2, 1911, 53.

Viscous Oils—Determination of Specific Gravity.—The difficulty of determining the specific gravities of dark-colored and viscous oils by means of the pyknometer may be avoided, according to a simple method recommended by E. Belimer, depending on the preparation of a dilute alcohol of the same specific gravity as the oil. In practice this is carried out by taking a known quantity of strong alcohol (98 to 99 per cent.), and adding water to this gradually from a burette until drops of the oil in the liquid just begin to float. The specific gravity can then be deduced directly from the burette readings.—Pharm. Journ. and Pharmacist, Nov. 4, 1911, 593; from Chem. Ztg., Sept. 12, 1911, 997.

Fatty Acids—New Method of Estimation in Soaps.—Th. Budde recommends the following method for estimating the fatty acids in soaps, which is applicable to all sorts with satisfactory results: To a neutral solution of 0.5–0.8 Gm. of the soap in 25 Cc. of water, contained in a tared flask, 25 Cc. of a standardized solution of copper sulphate (69.26 Gm. $CuSO_4$ in 1000 Cc.) are added with shaking. The flask with contents is then heated to boiling, whereby the voluminous copper compound of fatty acids collects partly on the surface and partly on the walls of the flask, which is allowed to stand 24 hours. The liquid portion is then filtered through a tared filter into a 250-Cc. flask and the filter repeatedly washed with cold water previously used for rinsing the precipitate and interior walls of the tared flask, which, together with the washed filter, is then dried at 103° C. in a glycerin-drying closet, to constant weight—this usually requiring about one hour. The excess of copper may then be determined volumetrically in the filtrate and the quantity of copper actually combined with fatty acids is thus ascertained. If then the combined copper is deducted from the weight of copper compound, and the equivalent quantity of hydrogen is added, the actual percentage of fatty acids is readily calculated. —Pharm. Ztg., lvi (1911), No. 20, 200; from Veröff. a. d. Geb. d. Milit.-Sanitatsw., 1911, No. 45, part IV.

Solid and Liquid Fatty Acids—Separation as Ammonia Salts.—David finds that the ammonium soaps of the solid fatty acids which he has so far investigated are quite insoluble in a large excess of strong solution of ammonia, whereas those of the liquid fatty acids are perfectly soluble. This difference of solubility enables them to be separated quantitatively. Two Gms. of the fat is dissolved in 5 Cc. of alcohol (95 per cent.) at a gentle heat. Fifty Cc. of solution of ammonia, sp. gr. 0.925, is then added, and heating continued until bubbles of gaseous ammonia appear. The clear liquid is then set aside for several hours, preferably over night, at a temperature of 14° C. The insoluble ammonium palmitate, or stearate, is then filtered out and washed on the filter with solution of ammonia of the same strength until a drop of the filtrate gives no precipitate with barium hydroxide solution. The soaps on the filter are then treated with pure

hydrochloric acid, sp. gr. 1.160, diluted with an equal volume of water. This immediately liberates the fatty acids, and the ammonium chloride is washed out, at first with acid water, as long as any ammonium chloride is present, and then with water. The fatty acids are then easily detached from the filter, transferred to a capsule, melted, dried at 100° C., and weighed. The liquid fatty acids may be determined by difference, or, if desired, by direct weighing. They are liberated from the ammoniacal filtrate by the addition of hydrochloric acid, collected in the usual manner and dried at 120° C. before weighing. The results obtained with mixtures of known proportions of liquid and solid fats have given figures showing an error of not more than 0.2 to 0.3 per cent. of the fatty acid weighed. The ammonium salts of stearic, palmitic, and of the acids obtained commercially by their distillation, and also of lauric and arachidic acids, are all quite insoluble in strong solution of ammonia of the sp. gr. 0.925.—Pharm. Journ. and Pharmacist, Feb. 25, 1911, 249; from Annal. Chim. Analyt., *16*, 1911, 8.

Fatty Acids—Medicinal Compounds with Iodine.—The value of the iodo-compounds of the fatty acids has been proved in the case of iodobehenic acid, $C_{22}H_{43}IO_{10}$, the calcium salt of which is known commercially as "Saiodine," and contains 24.6 per cent. of iodine. Posternak has prepared and examined a number of similar iodo-compounds, and finds that those containing two molecules of iodine, such as the di-iodo elaidic acids containing 45 to 47 per cent. of iodine, are most suitable for therapeutic use. These form definite, white, crystalline compounds, stable in the air and on exposure to light. They are tasteless and insoluble in the acid gastric secretion, but rapidly decompose in the alkaline intestinal fluid. Their employment is distinctly an advantage over the use of potassium iodide for the purpose of administering iodine. Iodine may be detected in the saliva in an hour after the dose has been taken.—Pharm. Journ. and Pharmacist, Feb. 11, 1911, 175; from Journ. de Pharm. et Chim., 1911, *3*, 30.

Elaïdic Acid—Chemistry.—A. Gawalowski has already shown that elaïdic acid may be separated into two distinct substances, which he named stearo-elaïdic acid and oleo-elaïdic acid. These acids have now been obtained in the pure state by a lengthy process of fractional crystallization. They are prepared by decomposing purified lead plaster with hydrochloric acid, and repeatedly crystallizing the acid deposited. *Stearo-elaïdic acid*, $C_{18}H_{30}O_2$, forms colorless cholesterin-like crystals, having a luster like mother-of-pearl; melting-point, 38.4° C.; specific gravity, 0.942 at 15° C. *Oleo-elaïdic acid*, $C_{18}H_{25}O_2$, is an oily semi-solid at ordinary temperatures. Specific gravity, 0.955; melting-point, 20.2° C. The sodium, potassium and lead salts of the two acids have also been prepared. The analyses show that neither of these acids is isomeric with oleic acid, $C_{18}H_{34}O_2$, or

ricin-elaïdic acid, $C_{18}H_{34}O_4$; gaeïdic acid, $C_{16}H_{30}O_2$, is not an isomer of stearo-elaïdic acid, although it melts at 38° and crystallizes, as also does ricin-elaïdic acid, in radiating clusters of needles, resembling uric acid.—Pharm. Journ. and Pharmacist, March 11, 1911, 333; from Pharm. Post, *103* (1910), 1033.

Stearolic Acid—New Isomers.—A. Arnand and S. Posternak find that the dihydriodic derivative of stearolic acid gives on reduction with zinc and acetic acid stearic acid, and on decomposition with alcoholic potash a complete mixture which contains the original stearolic acid and also two new isomers with the triple bond displaced to the next carbons on the left and right respectively. The separation of the two isomers is effected by converting them into diiodo derivatives, and then subjecting these to fractional crystallization. These reactions are not peculiar to stearolic acid, but apply also to other acids of the same series.—Chem. News, July 29, 1910, 60; from Compt. rend., *150* (1910), No. 19.

Coconut Oil—Cause of Abnormally High Iodine Value of Some Shipments.—One of the principal chemical characteristics of the ordinary coconut oil of commerce, pressed from copra, is its low iodine absorption, the iodine number in a large number of instances being very close to 8 per cent. W. D. Richardson, however, came across shipments of alleged coconut oil having iodine values of 18, 20, 24 and 21 respectively. It was found that these specimens were not pressed entirely from copra, but that considerable proportions of the waste material from desiccated coconut factories had entered the presses; this material consisted of parings of the rind from the coconut meats. As a control, a dozen coconuts were opened and the rind pared off from the meats. Both lots of the material were then dried separately at low temperatures, and the oil extracted by means of ether. The following results were obtained: Oil extracted from the meats, 8.90 iodine number, per cent., titer °C., 23.3; oil extracted from the rind, 40.25 and 25.5 respectively. The other constants, such as saponification number, were found to be identical with those obtained in the case of the ordinary coconut oil of commerce. The results indicate that a coconut oil of relatively high iodine value is not necessarily adulterated by a foreign oil, although it can hardly be known as "coconut oil" in the ordinary commercial sense of the term, inasmuch as coconut oil has long been understood in commerce to mean an oil pressed from copra, i. e., the whole dried coconut meat.—Pharm. Journ. and Pharmacist, Sept. 2, 1911, 325; from Journ. Ind. and Eng. Chem., August, 1911, 574.

Glyceryl Triformate (Triformin)—The Simplest Fatty Substance.—P. von Romburgh states that by repeatedly heating glycerin with excess of absolute formic acid, a mixture of esters is obtained, from which triformine, $C_3H_5(COOH)_3$, may easily be separated by fractional distillation, and crystallized. It is insoluble in cold water, but dissolves when heated. It

melts at 18° C.—Pharm. Journ. and Pharmacist, Oct. 22, 1910, 492 ; from Ztschr. phys. Chem., 1910, 70, 459.

Lard—Preservation by Treatment with Elm Bark.—Richard M. Altmann, remembering that elm bark has the reputation of preventing the rancidity of fatty substances, and that the American Indians prepared bear fat by melting it with a small piece of elm bark, thereby rendering it sweet for a long time, tried the effect of this treatment on leaf lard. After the usual preliminary treatment of washing, etc., the leaf fat was heated on a water-bath with pieces of elm bark in the proportion of two drams to the pound until entirely free from water, which can be told by the transparency of the fluid or when bubbles cease to rise. The product was perfectly sweet, and remained so after it had been exposed (in experimental quantities) to the atmosphere at different temperatures, during which period ordinary lard had become decidedly rancid.—South. Pharm. Journ., February, 1911, 204.

Sojabean Oil—Chemical Composition.—H. Matthes and A. Dahle have determined the chemical constituents of the fixed oil of sojabean, with the following results: The oil contains about 94 per cent. of total fatty acids, of which 80 per cent. are liquid, unsaturated, and 15 per cent. are solid and saturated, all in form of glycerin esters, while free fatty acids are present only in insignificant proportions. The liquid acids consist of about 70 per cent. oleic acid, 24 per cent. linolic acid, and 6 per cent. linolenic acid. The unsaponifiable portions of soja oil amount to only about 0.7 per cent. and are separable into a solid (55 per cent.) and a liquid portion. The solid portion is composed of a phytosterin (2.4 per cent.) with two double bindings, strongly lævorotatory, melting at 169° C., and about 97 per cent. of a lævorotatory phytosterin with a simple binding, melting at 139° C. The liquid portion (45 per cent.) consists of oxygenated, unsaturated compounds, which give phytosterin reactions. For the details of the comprehensive experiments made by the authors, the original paper must be consulted, in Arch, d. Pharm., *249* (1911), No. 6, 436–444.

Soja Oil—Constituents.—According to Dr. S. Keimatsu, the fixed oil of soja beans contains 0.2 per cent. phytosterin, in which stigmasterin could not be detected; also, about 12 per cent. of saturated acids, consisting preponderatingly of stearic and palmitic acids. Furthermore, the oil contains about 80 per cent. of unsaturated fatty acids, of which about 50 per cent. are isomeric with linolic acid, yielding an oxy acid of m. p. 158–159°. Besides this isomeric acid, the oil contains linolic acid, of m. p. 173–175°, and oleic acid of m. p. 126–127° C., the two last-named amounting to about 15 per cent. of the unsaturated acids.—Pharm. Ztg., lvi (1911), No. 75, 757; from Chem. Ztg., 1911, No. 91.

CARBOHYDRATES.

Carbohydrates—Photo-Synthesis in Absence of Chlorophyll.— It has been previously shown that hydrogen is one of the end products of the degradation of carbohydrates in plant cells, especially by the action of the glucolytic enzymes which have been isolated. It was believed that this hydrogen played an important part in the chemical synthesis which goes on in the cells, and that it reacts with carbon dioxide to produce formaldehyde in accordance with the equation $2CO_2 + 2H_2 = 2HCOOH + O_2$. Experiments have now been carried out by J. Stoklasa and W. Zdobrisky to test this view, and the results show that it is correct, provided ultra violet rays are allowed to act on the substance concerned. The light from a quartz mercury lamp was allowed to pass through a mica window into a vessel in which it encountered carbon dioxide and nascent hydrogen. Formaldehyde was found to be produced slowly, and in presence of potassium hydroxide this underwent polymerization to a sugar or mixture of sugars which was optically inactive and not fermentable by yeast. Osazones were obtained melting at 188–192°, and 196–200°, showing that the sugar was neither formose nor acrose; no reaction could be obtained for pentose, and the nature of the sugar is to be further investigated. It is suggested that the chlorophyll in plants acts as a means of absorbing ultraviolet rays.—Pharm. Journ. and Pharmacist, Nov. 19, 1911, 609; from Chem. Ztg., Sept. 8, 1910, 945.

Cellulose—Changes Occurring by Mercerization.—O. Miller observes that it has been supposed that mercerized cotton is a hydrated cellulose, but when cellulose is mercerized no increase of weight occurs, and Gladstone proved that mercerized and ordinary cellulose have the same composition. They are not, however, identical, for the former has the power of absorbing a greater amount of moisture than the latter, and retaining it more persistently. The change which occurs on mercerization is probably of the nature of isomerization. The degree of mercerization can be determined by substantive dyes.— Chem. News, March 17, 1911, 131; from Rev. d. D. Chem. Ges., *43* (1910), No. 17.

Cellulose—Electrolytic Decomposition.—R. Oertel finds that on electrolyzing cellulose in a neutral bath of potassium chloride, the strength of current and duration of its action being suitably proportioned to the size of the bath and of the electrodes, about two-thirds of it goes into solution, while the remainder becomes soluble in cold 10 per cent. solution of caustic soda; this portion retains its fibrous structure, but the fibers are much weakened. By somewhat different procedure a residue may be obtained which will form a milky colloidal solution with water, and the latter can be filtered through a not too close filter paper. This solution is not altered on heating, and gives no deposit on standing even for a month. Addition of acids or alcohol to it forms a thick jelly, which on warming

falls as a flocculent precipitate; this colloidal body is soluble in 10 per cent. soda solution or in strong ammonia. It appears to be a new oxycellulose.—Pharm. Journ. and Pharmacist, Aug. 5, 1911, 201; from Chem. Ztg., July 1, 1911, 713.

"Cellon"—An Incombustible Substitute for "Celluloid," Prepared from Acetylcellulose.—Dr. A. Eichengrun has patented (in France and England) a method making celluloid (substitute) of any shape, color and thickness, using acetycellulose instead of nitrocellulose, and thus producing an incombustible substitute for celluloid, which he calls "Cellon." According to his patents, "Certain types of cellulose acetate, notably those which are soluble in acetone, are soluble on heating, in mixtures of liquids, e. g., methyl alcohol and benzene, neither of which have any solvent action alone. On cooling these solutions, the ester may either remain in solution or separate out in the form of long felted filaments. The separation may be prevented by adding to the solution any of the ordinary solvents of cellulose acetate, in which it is soluble in the cold, e. g., glacial acetic acid, acetone, etc., in which case the solution remains liquid or becomes syrupy on cooling. Or else, there may be added a substance having an influence analogous to that of camphor in nitrocellulose, in which case the solution sets to a continuous mass on cooling. Suitable bodies are methyl acetanilide, ethyltoluenesulphonate, trichloraniline, etc. If a very concentrated mass be desired, the cellulose acetate may be dissolved in alcohol and benzene, freed from impurities by filtration, and allowed to deposit by cooling; the liquid is then poured off and the precipitated cellulose acetate worked up with a camphor substitute. One of the numerous examples of the process runs as follows: One kilo. of cellulose acetate is dissolved in 2 kilos. of methyl alcohol and 1 kilo. of toluene at 80° C.; 150 Gms. of methyl acetanilide are added to the solution and 100 Gms. of epichlorhydin. The liquid is filtered hot, and on cooling sets to a solid mass, which may be sliced, moulded, or pressed through orifices. In various ways plastic masses having all the technical properties of celluloid may be prepared."—Chem. News, Oct, 27, 1911, 203; from Ztschr. f. Angew. Chem., 1911, 366, through Journ. Ind. and Eng. Chem., iii (1911), No. 6.

Starches—Microscopic Distinction by Means of Sodium Salicylate.—Dr. W. Lenz directs attention to a new method of distinguishing starches from each other, which has been found useful in practice as previously reported in researches carried out in the Pharmaceutical Institute of the University of Berlin. It depends upon the changes in the starch grains recognized under the microscope after its immersion in a suspended drop of sodium salicylate solution (1 : 11) for a greater or less time, which makes it possible to divide the starches into two classes, the one in which the starch grain is not changed by the action of the salicylate within a given time,

the other in which the sphærocrystals of the starches are dissolved with more or less rapidity. This latter is particularly serviceable for the distinction of ryestarch from wheatstarch. The differences in the time noted for the solution of the sphærocrystals is, however, not due to the constitution of the sphærocrystals, but to the pellicle enveloping them. This is distinctly recognizable in the microscopic examination of the wheat granules, which retain their form more sharply defined in contrast with the ryestarch grains, in which the tender pellicle is knotted up and folded many times, while the thicker and denser envelope of the wheat starch granules is more resistent to the influence of the salicylate, causing slower diffusion, and consequent difficult rupture of the pellicle. The tender pellicle of the ryestarch permits rapid diffusion and is easily ruptured by the osmotic pressure exerted by the solution formed.—Apoth. Ztg., xxv (1910), No. 80, 777.

Starch—Rapid Method of Hydrolizing.—G. A. Olson gives the following details of a rapid method of hydrolizing starch: Place 1 Gm. of the material into a 500-Cc. Kjeldahl flask, tapping the neck of the flask in order to settle the fine particles adhering to the sides. Mix with this weight 10 Cc. of distilled water, and rotate slowly and steadily (one revolution per second) so as not to wash any of the sample too high up on the sides of the flask. Next, cautiously add 6 Cc. of sulphuric acid (sp. gr. 1.84), and rotate somewhat more rapidly than in the first instance. After the acid and material have been thoroughly mixed hold the flask in one hand over a flame about 2 inches high, and rotate about one revolution per second at first, and then as the mixture incseases in temperature rotate with an accelerated motion up to five revolutions per second. Continue rotating at this rate until the mixture becomes nearly transparent. At this stage add 10 to 15 Cc. of distilled water, continue rotating, and heat again, this time to boiling, cool, neutralize with sodium hydroxide (using phenolphthalein as indicator), cool again, transfer to 250-Cc. volumetric flask, fill with distilled water to mark, and proceed according to one of the recognized methods for dextrose determination. The starch content of a cereal, potato, or a feeding stuff is as valuable a component as a fat, protein, or ash constituent, yet it is seldom determined. With this new method it is possible to determine with facility the acid-hydrolizable part of nitrogen-free extract, and thus reduce the undetermined constituents to a minimum. When a starch is hydrolized with an acid, there is, of course, always the danger of converting a part or all of the pentosans, cellulose, and allied bodies into sugars.—Pharm. Journ. and Pharmacist, July 23, 1910, 97; from. Journ. Ind. and Eng. Chem., I, No. 7, 445.

Starch—Approximate Estimation by Iodine.—Lester Reed has found the following method of estimation to give approximate results in mixtures containing starch not previously heated: A quantity of substance contain-

ing about 0.1 Gm. of starch is heated to 190° C. with about 5 Cc. of glycerin for five minutes. The solution of starch in glycerin is then diluted to about 50 Cc., and filtered with aid of filter-pump and steam jacket. An ordinary German filter with platinum cone is better than a hardened filter. The cold solution is next precipitated with a strong solution of iodine in 10 per cent. KI solution. The precipitated iodide of starch should be granular. After standing it is collected on a fluted filter (previously moistened with water containing I + KI), then washed with boiling 90 per cent. alcohol. The filter is next spread on a glass plate, and the precipitate washed into platinum dish with a jet of boiling water. The contents of platinum dish are boiled to expel iodine, and afterwards evaporated over water-bath to constant weight, and corrected for ash. A sample of starch gave 80 against 83.7 theory. A mixture of starch and fat-free mustard gave 43 against 41.8 theory. A sample of flour showed 70 per cent. of starch.—Chem. News, Dec. 8, 1911, 271.

Starch—Preparation as an Indicator.—L. Mathieu observes that in using starch as an indicator in end-reactions with iodine solutions there is often indistinctness of the terminal point, when the blue color may be evanescent or the color may vary from violet to rose, due to the presence of dextrin. Further, starch solutions may contain swollen grains, which retain the blue color somewhat persistently, and thus destroy the delicacy of the end-reaction. The author, therefore, advises the use of soluble starch, which he prepares thus: The starch flour is digested for some time with a solution of hydrochloric acid, 1 in 1000, then washed with distilled water, dried at 30° C., and heated for some hours in an oven at about 100°. The weak acid treatment takes out traces of alkaline bases and alkaline earths, and transforms neutral phosphates into acid phosphates. When it is exposed to the dry heat its physical state is gradually modified into that of a soluble starch. The starch thus prepared and dried keeps perfectly. For use as a reagent 1 Gm. is dissolved by boiling for a few moments with 100 Cc. of water and filtering. The resulting solution is very limpid, free from granules, and with iodine is colored pure blue, the blue color being instantly discharged on removal of the excess of iodine. The use of preservatives is condemned.—Pharm. Journ. and Pharmacist, April 1, 1911, 433; from Ann. de Chim. Analyt., *15* (1911), 51.

Gums—Response to Moore's Reaction for Glucose.—Torald Sollmann reminds of an obsolete test for glucose and many other carbohydrates, which was introdued in 1844 by John Moore and F. Heller, but has been replaced by other sugar tests which are more reliable, particularly when small quantities are in question. The test depends on the development of a yellow to dark brown color when glucose solution is heated with KOH or NaOH. The author now finds that a number of gums (acacia, tragacanth, and cherry gum), and also allied substances (agar, cetraria, and

chondrus), give a golden-yellow or brownish-yellow color by this test, although they do not reduce Fehling's solution.—Amer. Journ. Pharm., April, 1911, 176.

Saccharose—Recognition and Estimation in Presence of Other Sugars.—In the course of experiments on the effect of alkaline solutions on arabinose, rhamnose, glucose, fructose, galactose, mannose, saccharose, invert sugar, maltose and lactose, Prof. A. Jolles found that all of these sugars, with the exception of saccharose, showed a marked decline in their optical rotation when treated with $\frac{N}{100}$ soda solution, and that with $\frac{N}{10}$ soda solution glucose, fructose, invert sugar, lactose and arabinose, present in the amount of 1 to 2 per cent. became optically completely inactive, while saccharose under all conditions of concentration retained its optical activity absolutely unchanged. The same results were observed when the alkaline sugar solutions were heated ¾ hour under a reflux condenser in a Lintner "pressure flask." This behavior of saccharose serves for its identification and estimation in the presence of the other sugars mentioned and leads him to outline a method adapted to this purpose.—Pharm. Ztg., lv (1910), No. 100, 1011; from Ztschr. f. Unters. d. Nahr.-u. Genussm., 1910, No. 10.

Saccharose—Hydrolysis by Ultra-violet Rays.—V. Henri and A. Rauc have subjected solutions of saccharose, in various concentrations, to the action of ultra-violet rays, with the following results: Decomposition into glucose and levulose takes place, and one molecule of hexoses thus formed is attacked in its turn, giving rise to the production of a series of derivatives, among them being osone, formic aldehyde, and carbon monoxide.—Pharm. Journ. and Pharmacist, July 15, 1911, 75; from Bull. Commerc., June, 1911, 290.

Sugar Refining—Use of Formaldehyde.—P. Yoder and W. G. Taggart observe that since fermentation is very prone to occur in sugar solutions if the process of refining is interrupted for a time, with consequent loss of sugar, it is very usual to add a little formaldehyde in such a case, when fermentation is completely prevented; it is also frequently added to assist clarification. It appears always to have been assumed that any formaldehyde added for either of these purposes is completely removed in the subsequent boiling down, but as this seems to be only an assumption, experiments were made to ascertain whether this is the case. Some difficulty is presented in obtaining evidence on the matter, as formaldehyde has been shown by Trillat and Ramsey to be produced when sugar is caramelized, and even when a sugar solution is boiled with caramelization. The method used in testing for formaldehyde was a modification of the ferric chloride and hydrochloric acid test used in milk analysis. The result showed that when pure sugar solution or raw sugar juice was distilled alone, the distillate contained only a trace of formaldehyde, but

if phosphoric acid was added before distillation, more was obtained, and this increased as caramelization increased. When formaldehyde was added to sugar solution, the amount recovered in the distillate showed that a portion was retained by the sugar, and the addition of sodium sulphite caused more of it, and of sodium thiosulphate almost the whole of it, to be so retained, but hydrogen sulphide had no such effect. When formaldehyde had been added to the juice or the sugar solution in the process of manufacture, little or none remained in the sugar, but a very considerable amount was found in the molasses, so much, in fact, as to raise the question of whether the molasses could be used as an article of diet without injury to health.—Pharm. Journ. and Pharmacist, Nov. 5, 1910, 551; from Zschr. f. Unters. d. Nahr. u. Genussm., Aug. 15, 1910, 208.

Caramel—Test of Identification.—G. H. P. Lichthardt proposes the following test for the identification of caramel: Tannic acid, 1.00 Gm.; sulphuric acid (sp. gr., 1.840), 0.75 Gm.; distilled water, sufficient to produce 50 Cc. Dissolve the tannic acid in about 30 Cc. of the water, add the sulphuric acid (the precipitate first forming will dissolve), and then the rest of the water; let stand for twenty-four hours, then filter. The solution keeps well. For vanilla extracts, add 5 Cc. of this solution to 5 Cc. of the extract, heat gently until the precipitate first formed is almost all dissolved, then, on standing for twelve hours or over night, a light or dark brownish substance (according to the amount of caramel present) will have been precipitated. True vanilla extract gives a very slight precipitate of a different character from that of caramel. With strong spirituous preparations (whisky, brandy, etc.) most of the alcohol is evaporated, water added, and the test applied as above.—Pharm. Journ. and Pharmacist, Dec. 25, 1910, 761; from Journ. Ind. and Eng. Chem., *II* (1910), 389.

Milk Sugar—Industrial Method of Preparation from Whey.—Th. Aufsberg gives some interesting details of the manufacture of milk sugar from whey separated in cheese manufacture, which may be briefly epitomized as follows: The whey, freed as much as possible from the other constituents of the milk, is heated at 90–92° C. after addition of 1–1½ per cent. of "Sauer" (whey sours), in order to remove the last traces of butter-fat. It is then clarified by adding from 1–8 per cent. more of the "Sauer" and heating near to boiling; the albumen is thus coagulated, and being skimmed off, leaves a crystal-clear fluid containing besides milk sugar (4.8–5.2 per cent.) and salts, only traces of the other milk constituents. The purified whey is now concentrated in a vacuum apparatus at 60–70° C. to syrup containing about 60 per cent. dry substance; this syrup is transferred to square ctystallizing tanks, which are immersed in cold water, and the thickening mass is stirred after 10 hours, and several times after-

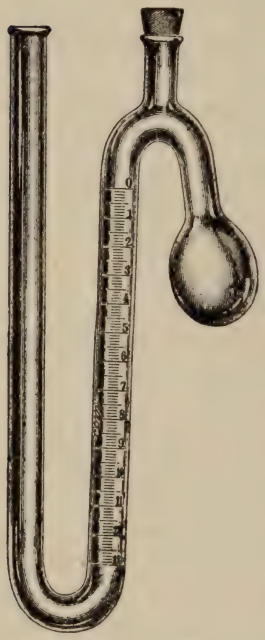
wards, forming a coarse-grained, yellow magma after 24 hours, from which about 3.85 per cent. of crude milk sugar is obtained by centrifugation—the mother liquor separated yieldiug by similar treatment about 0.5 per cent. more of crude milk sugar. The crude sugar so obtained is refined by dissolving it in a jacketed copper boiler in the necessary quantity of water, adding powdered animal charcoal and about 0.2 per cent. of acetic acid, heating to about 90° C., and then, after adding a little magnesium sulphate, to boiling. The liquid at first froths strongly and then becomes clear; it is filtered and transferred to the vats for crystallization. After several days the crystallization is completed, and the fine-grained magma is subjected to centrifuging—the mother-liquor yielding a second and third crop of crystals on appropriate treatment. The yield, with care, amounts to 2.5 per cent. of the weight of whey taken in operation.—Pharm. Ztg., lv (1910), No. 73, 735; from Chem. Ztg., 1910, No. 90.

Glucose—New Method of Determination.—B. Kohnstein recommends a new method for the determination of glucose, which is based on the well-known property of this sugar (also of dextrose) to convert ortho-nitrophenylpropiolic acid in alkaline solution into indigotin. The fluid under examination, if deeply colored, is diluted with water, rendered alkaline with sodium hydroxide solution, and heated ¼ minute with about 0.05 Gm. of o-nitrophenylpropiolic acid. In the presence of glucose, the liquid at first assumes a faint blue color, increasing later to an intensive blue, due to the formation of indigo blue, which is deposited, leaving the supernatant liquid of a pale yellow color. If the quantity of precipitate is large, it is washed with dilute acid, followed by cold diluted alcohol, then dissolved in chloroform, allowing the purple-red solution to evaporate spontaneously, and then weighing.—Pharm. Ztg., lvi (1911), No. 20, 199; from Ledermarkt. Collegium., 1910, 301–304, through Chem. Ztg., 1911, No. 15.

Glucose—Estimation in Urine by Means of Safranin.—K. A. Hasselbalch and J. Lindhard propose a method for the rapid estimation of glucose in urine, which is based upon the property of glucose to reduce safranin in alkaline solutions and thereby produce a sharply defined change of color while other normal constituents of urine have no effect. The test is made by adding the urine in measured quantities to a mixture of equal parts of safranin solution (1 : 10,000) and of 1 per cent. solution of potassium hydroxide, shaking, heating for 3 minutes in boiling water, and then noting the result. Assuming that 1 Cc. of the alkaline safranin mixture requires 0.25 Mgm. of glucose for reduction, the quantity of urine used serves as the basis for the calculation. The safranin solution has indefinite stability, but should initially be standardized to a glucose solution of known strength.—Pharm. Ztg., lv (1910, No. 75, 758; from Bioch. Ztschr., *27* (1910), No. 4.

Glucose—A New Form of Fermentation Saccharometer.—Von Toldenstern has devised and describes a new form of fermentation saccharometer (Fig. 69), which consists of a double U-shaped tube with limbs of unequal length. The short limb is closed, ending in a bulb for the reception of the yeast (either in substance or emulsion) and the fluid to be examined, which are introduced through the short tubulure extending upward from the bend. The central tube is provided with a scale divided into $\frac{1}{10}$ Cc., extending downward from the zero to 13 Cc., these extremes being situated about 20–25 Mm. below and above the bend in the tube respectively. In use, the material under examination and the yeast having been introduced through the tubulure into the short limb, water or paraffin oil, etc., is introduced through the long, open limb until it reaches the zero of the scale. The apparatus is then inclined somewhat so that the liquid reaches slightly above the zero mark, and the tubulure is now closed by means of a rubber stopper, driving this well into the tubulure, so that when adjusted vertically the liquid just reaches the zero mark. The greater part of the liquid in the long tube is then removed by means of a pipette to make room for the carbonic acid which is generated when the apparatus is subjected to the fermenting temperature in the thermostat in the usual manner.—Pharm. Ztg., lvi (1911), No. 67, 676.

FIG. 69.



Fermentation Saccharometer.

Aloinose — Identity with d-Arabinose.—Aloinose, which was at first thought by E. Léger to be a new sugar (see Proceedings 1910, 379), has now been found by him to be identical with d-arabinose. When liberated from the benzylphenylhydrazone it crystallizes in microscopic prisms, melting point 154.2° to 155.2° C $[a]$ —101.6°; melting point of benzylphenylhydrazone 168.8° to 169.8° C. This is the first record of the occurrence of d-arabinose as a natural product, and its formation is the first recorded instance of a pentose being produced by the hydrolysis of a glucoside, although there are instances in which methylpentoses have been so formed. Barbaloin is therefore a glucoside having the formula $C_{20}H_{18}O_9$, and its hydrolysis is represented by the equation $C_{20}H_{18}O_9 + H_2O = C_{15}H_{10}O_5 + C_5H_{10}O_5$. Isobarbaloin, when hydrolized with hydrochloric acid, forms the same sugar. It has previously been shown to furnish the same emodin when treated with sodium peroxide. Conse-

quently the isomerism of the two aloins is conclusively established.—Pharm. Journ. and Pharmacist, July 23, 1910, 97; from Compt. rend., *150* (1910), 1695.

Inositol: A characteristic constituent of "Wine Vinegars," which see.

Isomaltol—A New Derivative from Starch.—A. Backe has shown that by the combined action of an enzyme and heat on starch there is formed a body analogous but not identical with maltol. It has the same formula as maltol ($C_6H_6O_3$). The name given to it is isomaltol. The crystals of the substance are soluble in alcohol, chloroform, ether and benzene; it dissolves in hot water, but less readily in cold water and petroleum ether. It reddens litmus and is dissolved by sodium carbonate; its alkaline solutions are yellowish. It reduces cupro-potassic solution in the heat, ammoniacal silver nitrate in the cold. It gives iodoform with iodine and potash; with copper sulphate, green crystals of a compound whose formula is $Cu(C_6H_5O_3)_2 + H_2O$; with diazomethane, isomaltol gives a methyl derivative, $C_6H_5O_3CH_3$, which crystallizes from ether in hard tablets, soluble in water and in alcohol, and melting at 102° C. The corresponding derivative of maltol melts at 114° C. On hydrolysis of its methyl ether it gives only formic acid, without acetic acid. On oxidation it gives a compound having a characteristic odor: the compound is formed by treatment with Fehling's solution, potassium permanganate and silver oxide. In preparing isomaltol by distillation of biscuit powder, sugar, etc., with an acid, a small quantity of maltol is obtained, and if, instead of distilling, the biscuit powder is extracted with ether or chloroform, there is obtained maltol with very little isomaltol. It might be thought that the last results from a transformation of the maltol, but that is not so, since maltol resists absolutely the action of boiling phosphoric acid without isomerizing. It is thus clear that isomaltol is formed only by the acid distillation of a body which is produced under the same conditions as the maltol, because, without an enzyme and without previous cooking, the amylaceous material gives none. Under favorable conditions 7 Gms. of isomaltol may be obtained from 1 kilogram of biscuit powder. Mixtures of maltol and isomaltol may easily be separated by sublimation.—Pharm. Journ. and Pharmacist, Oct. 29, 1910, 517; from Compt. rend., July 4, 1910, 78.

Levulose—Influence of Inactive Substances on its Rotation.—N. Wender observes that most inorganic acids bring about a rise in the specific rotation of levulose, which increases with the strength of the acid. Among the organic acids used by the author, oxalic acid causes an increase, while in presence of acetic acid a small decrease in rotation takes place. Alkalies cause a fall in the specific rotation which increases with the time, and is due to isomeric change of the sugar. Feebly basic substances are almost without effect on the rotation. Inorganic salts in some cases cause a rise, while in other cases a fall in rotation is observed. Here also the con-

centration of the inactive substance is of importance. Alcohols and acetone bring about a decrease in rotation which is proportional to the amount of alcohol or acetone present.—Pharm. Journ. and Pharmacist, March 11, 1911, 333; from Bioch. Ztschr., 1911, 357.

Verbascose—A New Sugar from Mullein Roots.—E. Bourquelot and M. Bridel have isolated from the root of *Verbascum Thapsus* a new sugar, verbascose, which yields levulose, glucose and galatose on hydrolysis. The new sugar therefore resembles stachyose, with which it is possibly isomeric, but, aside of other properties, it differs from stachyose in having a higher melting point (220° instead of 170°), and a greater rotatory power. —Pharm. Ztg., lv (1910), No. 100, 1011; from Journ. de Pharm et Chim., 1910, No. 11.

ORGANIC ACIDS.

Acetic Acid—Variations Between Specific Gravity and Total Acidity.—T. Delphin, having on different occasions noted that the acidimetric value of acetic acid did not correspond with the percentage indicated by its specific gravity, has made a systematic investigation of the probable causes. In general, the specific gravity indicated lower percentages than were found acidimetrically, and this led him to suspect that the presence of homologous fatty acids—propionic and butyric—which have a markedly lower specific gravity than acetic acid, might be responsible for the observed differences. In experiments, which are described in detail in the author's original paper, he has been able to demonstrate the presence of both butyric and propionic acids. These acids are evidently derived from the wood vinegar, from which the acetic acid is usually prepared, and the author therefore regards it advisable to insist that the specific gravity of acetic acid must correspond with the actual acid percentage.—Pharm. Ztg., lv (1910), No. 80, 81; from Svensk. farm. tidskrift, 1910, No. 15.

Glacial Acetic Acid—Contamination with Formic Acid.—It has been pointed out by Ost and Klein that commercial glacial acetic acid commonly contains formic acid, and by Pikos that it is quite easy to produce acetic acid free from this impurity. H. Fincke finds, however, that there has been no improvement in this respect, five samples examined by him containing from 0.018 to 0.806 per cent. of formic acid, and he recommends the inclusion of the following test in the pharmacopœial description: Ten Cc. of a 1 in 10 solution of glacial acetic acid, heated with 1 Gm. of sodium acetate and 5 Cc. of a 1 in 20 solution of mercuric chloride for half an hour in a boiling water-bath should show no precipitate or turbidity. The limit of the amount detected by this test is about 0.2 per cent. If it is desired to determine the amount present in a sample, 5 Cc. of the glacial acid, 5 Gms. of sodium acetate, 40 Cc. of 1 in 20 solution of mercuric chloride, and 30 Cc. of water should be heated in an Erlenmeyer flask for two hours in a boiling water-bath under a reflux condenser, the

part of the flask containing the liquid being fully immersed; the precipitated calomel is collected in a Gooch crucible, dried, and weighed; its weight multiplied by 0.0977 gives the weight of formic acid.—Apoth. Ztg., xxv (1910), No. 76, 727.

Rectified Pyroligneous Acid—Characters and Tests.—G. Mossler says that rectified pyroligneous vinegar, or purified wood vinegar, for medicinal use, is prepared by distilling crude pyroligneous acid from a glass retort by means of a moderate heat until four-fifths have passed over; it should be a colorless or yellowish to brownish-yellow liquid, with sour empyreumatic odor, showing from 4.5 to 6.0 per cent. of acetic acid when titrated with normal alkali, using phenolphthalein as indicator. If 10 Cc. is diluted to 100, and 10 Cc. of the diluted liquid mixed with 30 of dilute sulphuric acid, and 30 Cc. of potassium permanganate solution (1 in 1000), the color of the latter should disappear within five minutes, showing a proper proportion of empyreumatic constituents. When mixed with an equal volume of water it should not be darkened by sulphuretted hydrogen, and should give not more than an opalescence with silver nitrate or barium nitrate.—Pharm. Journ. and Pharmacist, Oct. 15, 1910, 465; from. Ztschr. d. allgem. Oesterr. Apoth. Verein, Aug. 27, 1910, 345.

Crystalline Ferric Acetate—Production and Composition.—Supplementary to a previous article on ferric acetates, R. F. Weinland and Ernst Gusmann state that a crystalline ferric acetate may be obtained by evaporating a concentrated solution of one molecule of ferric chloride and three molecules of sodium acetate. The concentrated aqueous solution of the salt gives with sodium platinum chloride the characteristic chloroplatinate of the hexa-acetatotriferric base. The salt is a compound of one molecule of the mono- and bi-acetates of this base.—Chem. News, Oct. 14, 1910, 197; from Ztschr. f. Anorg. Chem., *67* (1910), No. 2.

Trichloracetic Acid—Splitting into Chloroform and Carbonic Acid by Antipyrine.—The splitting of trichloracetic acid by the action of dimethylaniline, diethylaniline, methyldiphenylamine, chinoline, pyridine and aniline, into chloroform and carbonic acid has heretofore been described by a number of investigators. R. Stollé now finds that antipyrine also has this effect. If 1.0 trichloracetic acid, 0.5 antipyrine and 2 to 3 Cc. of water are boiled about half a minute in a test tube, and the flame is then removed, the evolution of gas results and the odor of chloroform is manifested. Carried out in this way, the test excludes confusion with chloral hydrate which, though yielding chloroform with alkali, does not yield any with antipyrine.—Pharm. Ztg., lv (1910), No. 91, 917; from Ber. d. Deutsch. Pharm. Ges., 1910, No. 7.

Benzoic Acid—Modified Method of Detection.—G. Deniges recommends the following modification of Jonescu's method of detecting benzoic acid: To 4 Cc. of an aqueous solution supposed to contain benzoic acid, placed

in a test-tube, add 0.2 Cc. of 20 per cent. (by volume) acetic acid, 0.2 Cc. of solution of ferric chloride diluted with an equal volume of water, and 0.2 Cc. of one-volume hydrogen peroxide ; boil for ten to fifteen seconds. There is obtained a violet coloration even when the sample contains not more than 0.5 Mgm. of benzoic acid per Cc. In cases where smaller quantities are concerned a blank experiment should be made at the same time, heating both tubes in a boiling water-bath for the same length of time. To detect a benzoate by this method the solution should be acidified with sulphuric or hydrochloric acid, shaken out with ether, decanted, filtered, the ether evaporated in a test-tube in presence of 4 Cc. of distilled water previously boiled, and then treated as above. When the acid is present in alimentary products, the suspected matter, liquid or solid, is treated with water and distilled in a current of steam after acidulation with dilute sulphuric acid ; the distillate is extracted with ether and the process carried out as above.—Pharm. Journ. and Pharmacist, Aug. 5, 1911, 201 ; from Bull. Soc. Pharm. de Bord., June, 1911, 249.

Benzoic Acid—Convenient Method of Detection as Preservative in Butter.—M. Marchadier recommends the following method for detecting benzoic acid in butter, which is rapidly carried out (15 minutes at the most) and is quite simple : Into an Erlenmeyer flask containing 20 Cc. of distilled water introduce 25 Gms. of the butter, a pinch of powdered pumice stone, and 0.5 Cc. of sulphuric acid. Attach the flask to a condenser suitable for the distillation of fatty acids, and heat. Collect the first 15 Cc. of distillate and add to it (1) one drop of 1 per cent. solution of ferric chloride ; (2) two drops of 12-volume hydrogen dioxide diluted to 10 per cent. Shake, and allow to rest. In three to six hours, if benzoic acid be present, a very distinct violet coloration results which persists for several hours. Trial experiments with margarine containing 1 to 4 Gms. of benzoic acid per kilogram have always given the author positive results. The method is not specific for benzoic acid ; all phenol bodies give the same reaction, but pure butter gives no reaction.—Pharm. Journ. and Pharmacist, April 22, 1911, 525 ; from Annal. des Falsif., January, 1911, 28.

Bismuth Benzoates—New Basic Compounds.—Godfrin has prepared crystalline neutral bismuth benzoate and four other basic bismuth benzoates. The neutral salt is obtained by the double decomposition of bismuth nitrate and sodium benzoate in presence of glycerin. Crystalline bismuth nitrate, 6 Gms., is crushed in a mortar, then dissolved with a mixture of 6 Gms. of glycerin and 6 Gms. of water. When a clear solution has been obtained a solution of sodium benzoate, 6.2 Gms., in glycerin, 6 Gms., and distilled water, 12 Gms., is added with constant stirring until a homogeneous mass results. This is then treated with 80 Cc. of a 2 : 1000 aqueous solution of benzoic acid, poured into a crystallizing dish

and stood in a cool place, at 10–15° C., for several days. When crystallization is complete the mother liquor is decanted and the crystals are suspended in water saturated at 15° C. with benzoic acid and drained at once on the filter pump. This method of washing is repeated a second time. The crystals are then dried, either in the air or over sulphuric acid. It forms light brilliant needles, probably belonging to the orthorhombic system, resembling light quinine sulphate in appearance. They are moistened with difficulty and contain only a trace of free benzoic acid, which is readily driven off between 110–120° C. The salt is permanent in the air and unaltered by heat below 140° C., at which temperature it begins to darken. On analysis it responds to the formula $Bi(C_6H_2CO_2)_3$. The basic salt $Bi_4O_3(C_6H_5CO_2)_6$ is obtained by treating the above neutral salt with twenty times its weight of absolute alcohol. The alcohol is added a little at a time with constant agitation, and after the whole has been used the mixture is set aside in a closed flask for ninety minutes. The crystalline precipitate is then drained and dried over sulphuric acid. It consists of an opaque white powder composed of well-defined micro-cubes. The basic salt, $Bi_2O_3(C_6H_5CO_2BiO)_{12}$, is obtained by treating the neutral salt with at least twenty times its weight of alcohol or of ether for several days. It forms a slightly yellowish powder, partly amorphous and partly crystalline under the microscope. The most basic salt, $Bi_2O_3(C_6H_5CO_2BiO)_6$, is obtained by boiling the neutral salt in a large volume of alcohol, 95 per cent. It forms a dull white powder of micro prisms. Bismuthyl benzoate, $C_6H_5CO_2BiO$, has also been prepared in the form of a light crystaline powder stable in the air, and when heated below 140° C. It is used as a substitute for bismuth salicylate, under the name of "Lutol."—Pharm Journ. and Pharmacist, Dec. 3, 1910, 663; from Journ. de Pharm. et Chim., 1910, *2*, 385.

Ferric Benzoate—Formula for its Preparation When Required for Making Ferrated "Cod-Liver Oil," which see under "Pharmacy."

Chlorogenic Acid—Wide Distribution in Plants.—C. Charanx observes that recent investigations show that chlorogenic acid is very widely distributed in the vegetable kingdom. By decomposing this acid into caffeic acid, a simple method for isolating which is given, the author has been able to detect its presence and to determine its amount in plants belonging to the following natural orders, given in the order of relative quantity obtained: *Orabanchaceæ, Scrophulariaceæ, Labiatæ, Verbenaceæ, Aquifoliaceæ, Compositæ, Jasminaceæ, Solanaceæ, Ranunculaceæ, Dipsacaceæ, Liliaceæ*, and *Caprifoliaceæ*. The amount of caffeic acid isolated varied from 10 per cent. to 0.6 per cent., equivalent to twice as much chlorogenic acid. The highest yield was derived from the subterranean bulbous portion of *Orobanche rapum*, which contains as much as 20 per cent. of chlorogenic acid at certain periods of its growth. The smallest amount

was got from elder flowers.—Pharm. Journ. and Pharmacist, Dec. 3, 1910, 663; from Journ. de Pharm. et Chim., 1910, *2*, 292.

Chrysophanic Acid from Chrysarobin—Constituents.—The investigations of O. A. Oesterle and U. Johann lead to the conclusion of the authors that the metoxyl compound associated with commercial chrysophanic acid from chrysarobin is not, as has heretofore been assumed, methyl chrysophanic acid, but is frangula- (rheum-) emodin-monomethyl ether, that is to say, the same monomethyl ether that is obtained by the partial demethylization of frangula-emodin trimethyl ether. It follows from this that chrysarobin cannot contain either the methylchrysarobin of Hesse nor the dichrysarobin methyl ether described by Jowett and Potter. The methoxyl compound associated with rheumchrysophanic acid and described as rheochrysidin, and also the lichecrysophanic acid described under the name of phycion, are found to agree in their composition and properties with the emodin monomethyl ether.—Arch. d. Pharm., 248 (1910), No. 7, 481–491.

Sodium Cinnamate—Volumetric Method of Valuation.—P. Lemaire finds that the sodium cinnamate of commerce varies greatly in general characters and in chemical constitution. Some specimens are neutral, and others either acid or alkaline towards phenolphthalein. The degree of hydration is also very variable. Since cinnamic acid reacts with phenolphthalein, but is without influence on helianthin, the amount of the pure salt in a given sample, as well as the amount of free acid or alkali, may be determined volumetrically. A convenient quantity to use is 1.7 Gm., or one hundredth of the molecular weight. This is dissolved in exactly 100 Cc. of water. The amount of free acid or of free alkali, if present, is then determined with deci-normal acid or alkali as the case may be, with phenolphthalein indicator. Then another 10 Cc. of the original solution is treated with 20 Cc. of $\frac{N}{10}H_2SO_4$, and after standing the liberated cinnamic acid is filtered out. The amount of uncombined H_2SO_4 remaining in 15 Cc. of the filtrate is then determined, with $\frac{N}{10}NaOH$ against helianthin. The necessary correction for any free acid or alkali present having been made, the result indicates the acid used up by the sodium in the salt; from this the amount of anhydrous sodium cinnamate present is calculated. —Pharm. Journ. and Pharmacist, Sept. 17, 1910, 365; from Rep. de Pharm., *22* (1910), 295.

Citric Acid—Estimation as Carbonic Acid.—P. Weijer recommends a method for the estimation of citric acid, which is based upon its oxidation to carbonic acid by permanganate. The solution containing the citric acid is distilled after the addition of dilute sulphuric acid, and 3 per cent. potassium permanganate. The liberated carbon dioxide is received in a solution of baryta, and the excess baryta titrated with standard hydrochloric acid. One molecule of citric acid produces three molecules of

carbon dioxide and one molecule of acetone.—Pharm. Journ. and Pharmacist, Oct. 1, 1910, 417; from Pharm. Weekbl., *46*, 990.

Copper Citrate—the composition of the commercial salt—is the subject of a chemical investigation by W. A. Puckner and L. E. Warren, which appears in "Proceedings," 1910, 1013–1021.

Lithium and Sodium Tricitrate—A New Double Salt.—J. Szirmay and V. Arany obtain a chemically pure double citrate of lithium and sodium by dissolving sodium hydroxide, purified by alcohol, and chemically pure lithium carbonate in water in molecular proportions, adding a solution of the molecular quantity of citric acid in water, boiling the mixture for some time and then concentrating the solution by evaporation to crystallization. The new salt so obtained has the composition: $Li_2C_6H_5NaO_2$. The process, which is patented in France, is available for preparing double salts of lithium or sodium citrate with the citrates of other metals.—Pharm. Ztg., lv (1910), No. 81, 817; from Chem. Ztg., 1910, No. 112.

Formic Acid—Distinct Forms of Catalytic Decomposition.—According to P. Sabatier and A. Mailhe, the catalytic decomposition of formic acid may be effected by three distinct reactions, viz.: (1) $HCOOH = CO_2 + H_2$. (2) $HCOOH = CO + H_2O$. (3) $2(HCOOH) = HCOH + CO_2 \times H_2O$. The predominance of one or the other of these reactions depends upon the special properties of the catalyzing oxides, which are dehydrogenating (ZnO, SnO) or dehydrating ($TiO_2Tu_2O_5$). With mixed catalyzers (ThO_2) the three reactions take place simultaneously.—Pharm. Journ. and Pharmacist, Sept. 2, 1911, 325; from Compt. rend., 1911, No. 19, 1212.

Formic Acid—Quantitative Determination.—H. Franzen and F. Egger determine formic acid by means of mercuric chloride, which is converted into calomel according to the equation: $HCOONa + 2HgCl_2 = 2HgCl + HCl + NaCl + CO_2$. The reagent prepared with mercuric chloride, 200, sodium acetate, 300, sodium chloride, 80, water to make 1000. The solution is allowed to stand for a day or two, then decanted from the precipitate. Fifty Cc. of this is mixed with the approximate equivalent of 0.5 Gm. of formic acid as a salt in 1 liter of water, and the mixture is heated in the boiling water-bath for three to three and a-half hours. The precipitated calomel is the collected and weighed.—Pharm. Journ. and Pharmacist, July 1, 1911, 9; from Journ. f. Prakt. Chem., *83* (1911), 323.

Formic Acid—Estimation in Presence of Acetic Acid.—H. Delehaye makes objections to several methods in use for the estimation of formic acid in the presence of acetic acid, and recommends a modification of that devised by Scala, which consists in the reduction of mercuric chloride, drying the precipitated calomel at 200° C., and weighing. Instead of calomel, the author obtains the mercury in the form of mercurous sulphate, which is a very dense, stable, anhydrous substance, depositing easily; its solubility in water is 1 in 500. The mercuric sulphate solution is prepared

thus: 10 Gms. of yellow oxide of mercury is placed in a flask of 250 Cc. with 20 mils. of hot water; sulphuric acid is added drop by drop, until the oxide is dissolved, heating further if necessary. . On cooling, the volume is made up to 250 Cc.; 50 Cc. of this solution contains 2 Gms. HgO. To the liquid to be tested, which should contain between 0.10 Gm. and 0.20 Gm. of formic acid, 50 Cc. of the mercuric solution is added, the mixture, placed in a conical flask furnished with a long tube, is placed on a boiling water-bath and heated for three-quarters of an hour. The apparatus is then cooled rapidly in a current of cold water and the liquid decanted, after settling, on to a tared filter. From the filtrate collected, a correction is made for the solubility of the salt, the figure being 0.20 Gm. per 100 Cc. of the filtrate. The precipitate remaining in the flask is washed on to the filter with a saturated solution of mercurous sulphate, further washed with 50 per cent. alcohol, dried at 110° C., and weighed. The total weight multiplied by 0.0927 gives the content of the formic acid in the sample taken. For qualitative work, the precipitate shows under the microscope the characteristic appearance of fern leaves.—Pharm. Journ. and Pharmacist, November 12, 1910, 577; from Ann. des Falsific., September, 1910, 386.

Hexahydrophenylglycolic Acid—Preparation and Properties.—According to M. Godchot and J. Frezouls, a new compound, hexahydrophenylglycolic acid, can be prepared from hexahydrobenzoic aldehyde, which combines with hydrocyanic acid to give hexahydrophenylglycolic nitrile, from which the acid is obtained by saponification. The acid crystallizes in prismatic needles which are slightly soluble in water; melting-point 130–131 C. It is very soluble in ether, alcohol, and acetone. Since it possesses an asymmetric carbon atom it should yield active isomers, which the authors intend to prepare and investigate.—Chem. News, July 29, 1910, 60; from Compt. rend., *150* (1910), No. 19.

Lactarinic Acid—A New Fatty Acid from Fungi.—J. Bougault and C. Charaux have obtained from several fungi of the genus *Lactarius*, *L. theiogalus*, *L. plumbeus*, *L. pyrogalus*, and *L. uvidus*, a new fatty acid, lactarinic acid, $C_{18}H_{34}O_2$. The dry powdered material was extracted with boiling 90 per cent. alcohol; the extract obtained on distilling off the solvent was treated with boiling water, and shaken out while still tepid, with ether. The residue left on distilling off the ether was extracted with petroleum ether, and filtered while warm. On cooling the filtrate deposited crystals of the new fatty acid. When purified by recrystallization from boiling 90 per cent. alcohol this was obtained in small, white, shining scales, greasy to the touch, melting at 89° C. It is insoluble in water; soluble in most hot organic solvents, from solution in which it separates on cooling. Its ethyl ester is more soluble, and melts at 41° C. Its oxime $C_{18}H_{34}(NOH)O_2$ does not melt very sharply between 59–61° C. With nascent hydrogen

from sodium and absolute alcohol, *dehydrolactarinic acid*, $C_{18}H_{32}O_3$, is obtained, which is oxystearic acid. The hydriodic ether of this yields stearic acid on reduction. Lactarinic acid does not appear to occur in all species of *Lactarius*. Some contain another acid, which may prove to be identical with that found by Bissinger, in 1883, in *Lactarius piperatus*.—Pharm. Journ. and Pharmacist, Dec. 9, 1911, p. 779; from Journ. de Pharm. et Chim., 1911, *4*, 337.

Lactic Acid—Comparison of U. S. P. and G. P. Methods of Assay.—George E. E'We finds that the U. S. P. method for the assay of lactic acid gives low results because it fails to provide for the presence of some 10 to 15 per cent. of "lactone anhydride," which in reality should be included in calculating the real strength and value of the sample. The method of the G. P., in which an excess of standard alkali is added to the weighed sample, which is then heated on a steam bath and titrated back with standard acid, gives much higher results. A sample which assayed 73.8 per cent. by the U. S. P. method assayed 90.0 per cent. by the G. P. method. All of seven samples assayed by the U. S. P. method gave figures below the standard (75 per cent.)—the average being 73.73 per cent. The average of four samples analyzed by the G. P. method was 89.18 per cent.—Proc. Pa. Pharm. Assoc., 1911, 310.

Lactic Acid—Assay Without Heat.—Elias Elvove records experiments which show that the titration of lactic acid at a boiling temperature is not alone unnecessary, but may even yield varying and considerably lower results than by the residual titration process. He therefore recommends the following assay process as efficient and reliable: To about two Gm. of the sample, accurately weighed, add 50 Cc. of normal NaOH, mix well and let stand for half an hour. Then titrate the excess of alkali with normal sulphuric acid, using phenolphthalein as indicator. The number of cubic centimeters of alkali consumed by the lactic acid, multiplied by the lactic-acid equivalent of 1 Cc. (0.09 Gm.), and this product divided by one-hundredth of the weight of the sample taken for the assay, will express in percentage the lactic-acid strength of the sample.—Amer. Journ. Phar., Jan., 1911, 14–19.

Iron Lactate—Improved Method of Estimating the Iron.—F. Lehmann observes that the usual method of determining the iron in iron lactate is to ignite the salt and weigh the residual ferric oxide; but any non-volatile impurity is then weighed with it, and if soluble substances are washed out the method is much less convenient. It is best to destroy the organic matter and determine the iron by titration; peroxide of hydrogen readily acts on the salt, with evolution of CO_2 and O. The test may be carried out as follows: 0.5 Gm. of the lactate in fine powder is dissolved in 15 Cc. of ordinary 10-volume solution of hydrogen peroxide by shaking; about 5 Cc. of strong sulphuric acid is then added, and the mixture heated

to boiling and boiled for two minutes, to decompose all excess of peroxide; it is then cooled, about 25 to 30 Cc. water and 1 to 2 Gms. potassium iodide are added, and the whole set aside in a well closed flask for an hour, when the liberated iodine is titrated with $\frac{N}{10}$ thiosulphate, each Cc. of which represents 0.00799 Fe_2O_3, or 0.0144 of the lactate.—Apoth. Ztg., xxvi (1911), No. 13, 125.

Calcium Oxalate—Reactions.—W. O. Coninck and A. Raymond have studied some of the reactions of calcium oxalate. They find that calcium oxalate containing water of crystallization reacts with gaseous chlorine at a gentle heat with evolution of carbon dioxide and formation of calcium chloride. The same reaction takes place if a mixture of calcium oxalate and potassium dichromate is treated with concentrated hydrochloric acid. Bromine and iodine act upon calcium oxalate in a similar manner. When warmed with concentrated hydrochloric acid the salt slowly dissolves, and the solution gives off a small amount of carbon dioxide when heated to boiling. Dry hydrogen chloride or bromide acts upon calcium oxalate at a low red heat with production of carbon dioxide, carbon monoxide and calcium chloride or bromide. Calcium oxalate dissolves in concentrated nitric acid on gently warming; when heated more strongly the following reaction takes place: $CaC_2O_4+3HNO_3=Ca(NO_3)_2+NO_2+H_3O+2CO_2$. When the salt is heated with excess of concentrated sulphuric acid a gas consisting of equal volumes of carbon monoxide and dioxide is evolved. On dry heating, calcium oxalate loses the water of crystallization just above 100° C., and at a low red heat slowly gives off carbon dioxide and gradually chars. At a bright red heat carbon monoxide is suddenly evolved. When silica and calcium oxalate are heated in molecular proportions to a bright redness, carbon dioxide and calcium silicate, $CaSiO_3$, are obtained, but when a large excess of silica is used the silicate, $3SiO_2.2CaO$, is the chief product. Excess of boric acid under the same conditions gives carbon dioxide and a mixture of various basic borates. Titanium dioxide acts upon calcium oxalate in the same way as boric acid. Uranium hydroxide, $UO_3.H_2O$, at a dark-red heat gives carbon dioxide, calcium carbonate, and uranium dioxide. The action of heat upon mixtures of calcium oxalate with various other oxides has been investigated. Ferric oxide, ferroso-ferric oxide, lead peroxide, manganese dioxide, bismuth oxide, and barium peroxide all liberate carbon dioxide, leaving a residue of a lower metallic oxide mixed with lime or calcium carbonate. Antimony trioxide is reduced to metallic antimony. Stannic oxide is unchanged and the calcium oxalate is split up into calcium oxide and oxides of carbon.—Pharm. Journ. and Pharmacist, Sept. 30, 1911, 437; from Bull. Soc. Chim. de France (4) 9, 301–306.

Picric Acid—Cause of Yellow Coloration when Exposed to the Air.—It is well known that picric acid is precipitated by mineral acids in a color-

less condition from its solutions, although the commercial article has a faint yellowish color; but on exposure to the air it soon acquires an intense yellow color. The experiments of A. Stepanow have demonstrated that this yellow color is only superficial, covering the surface merely, and that it is due to the formation of ammonium picrate, the ammonia being derived from the air.—Pharm. Ztg., lv (1910), No. 55, 557; from Lieb. Annal. d. Chem., 1910, 219.

Quinic Acid—Preparation, Characters, and Lithium Salt.—G. Mossler obtains quinic acid (tetraoxyhexahydrobenzoic acid), $C_6H_7(OH)_4.COOH$, by extracting cinchona bark well with cold water, precipitating the alkaloids and cinchotannic acid by adding milk of lime and filtering, then concentrating the filtrate to syrupy consistence, and setting it aside in a cool place for some weeks to crystallize; the calcium quinate so obtained is purified by recrystallization and then decomposed with sulphuric or oxalic acid. Quinic acid forms colorless and odorless crystals of acid taste, melting at 163° C.; soluble in two parts of water, less soluble in alcohol, ether, or chloroform; lævorotatory. When warmed with caustic alkali and a little iodine, iodoform is produced; when carefully fused with caustic alkali it forms protocatechuic acid, the yellowish-green mass dissolving in water to a reddish solution which is decolorized on adding hydrochloric acid, and this acid solution becomes dark green with ferric chloride and dark red when neutralized with sodium carbonate. The purity of quinic acid is shown by the melting point, the absence of more than the slightest trace of sulphate, chloride, and oxalate, and of any weighable quantity of ash, and by the production of a colorless solution in sulphuric acid.

Lithium Quinate is met with in form of 50 per cent. solution, exploited under the name "Liquor Urosini." It may be prepared by boiling a solution of quinic acid with lithium carbonate, and evaporating to the proper strength. This solution is a slightly yellowish syrupy liquid, acid in reaction, of specific gravity 1.264; it is miscible with water in all proportions, but gives a white precipitate with alcohol; if kept at a low temperature prismatic crystals of lithium quinate are deposited. It may be identified by giving the lithium flame test, and yielding quinone when heated with manganese dioxide and dilute sulphuric acid; if the mixture is shaken with ether and the latter evaporated, yellow volatile crystals of quinone, with the characteristic odor, are obtained. Lithium quinate solution gives iodoform when warmed with alkali and iodine; it should be free from more than traces of calcium, sulphate and chloride, and should yield from 50 to 54 per cent. of residue when dried at 110°, and 11.7 per cent. of sulphated ash.—Pharm. Journ. and Pharmacist, July 16, 1910, 71; from Ztschr. d. allgem. Oester. Apoth. Ver., 1910, 169.

Quinic Acid—Reactions—R. Guyot observes that quinic acid, $C_7H_{12}O_6$, occurs in sugar-like crystals, and has an acid taste like that of citric acid

The crystals are anhydrous, and are very soluble in water and in alcohol. The aqueous solution when exposed to the air is rapidly attacked by moulds, which set up protocatechuic fermentation. The acid is eliminated from the organism in the form of hippuric acid. The following test may be used to identify the substance: Into a test-tube are placed 2 Cc. of sulphuric acid, 1 drop of resorcin reagent, then 2 Cc. of an $\frac{N}{10}$ quinic acid solution. In the cold there is no apparent reaction, but on heating a very fine green fluorescence develops, and remains for a long time. It is necessary to have the liquid sufficiently dilute in order to see the fluorescence to the best advantage. The reaction is characteristic, and may be used inversely for the detection of resorcin. Sulphuric acid gives, in the heat, with the solution of quinic acid a green coloration, but no fluorescence. On dropping a particle of betanaphthol into such a solution there is developed on the surface a rose tint passing to vivid red, very distinct from the green solution. This when heated fluoresces green. On dry distilling quinic acid, hydroquinone is obtained.—Pharm. Journ. and Pharmacist, April 8, 1911, 461; from Bull. de la Soc. de Pharm. de Bord., February, 1911, 52.

Racemic Acid—Utility as Analytical Reagent.—A. Kling finds that when a cold 3 to 5 per cent. solution of barium acetate is treated with a 10 per cent. solution of racemic acid, barium racemate is not immediately precipitated, although it is only slightly soluble, but it appears as a voluminous crystalline precipitate after standing for several hours. With calcium or strontium acetate, on the other hand, a precipitate of the racemate is obtained in a few seconds. If considerable quantities of barium are present with the calcium or strontium acetate the delicacy of the test is somewhat impaired, but nevertheless 1 part of calcium in 500,000 or 1 part of strontium in 20,000 of a barium salt may be detected by this reaction. It is not possible to effect a quantitative separation of barium from calcium and strontium in this way, because the calcium or strontium racemate always carries down a little barium salt, but the barium may be removed by dissolving the precipitate in dilute hydrochloric acid and reprecipitating with sodium acetate. Calcium in acetic acid solution may be precipitated completely by 10 per cent. racemic acid solution even in presence of phosphoric acid, citric acid, magnesium, iron, or aluminium salts. In presence of magnesium acetate the precipitate must be dissolved in dilute hydrochloric acid and reprecipitated with racemic acid and sodium acetate. If iron and aluminium salt are present together it is necessary to treat the original solution with ten or fifteen times the quantity of neutral sodium tartrate, dissolve the precipitate in dilute hydrochloric acid, and reprecipitate with sodium acetate in presence of a little racemic acid. Strontium may also be determined quantitatively by racemic acid in the absence of iron and aluminium salts, but the results are not quite so accurate as with calcium. In presence of aluminium and iron salts together the quantita-

tive separation of strontium is not possible, even if neutral sodium tartrate is added.—Pharm. Journ. and Pharmacist, Oct. 7, 1911, 463; from Bull. Soc. Chim. de France, *9* (1911), 355–361.

Salicylic Acid—True, Natural and Synthetic Production.—Charles G. Merrill contributes an interesting account of history, characters, preparation and uses of true, natural, and synthetic salicylic acid. Salicylic acid was first isolated by Löewig in 1839 from the leaves of *Spiræa Ulmaria*, and subsequently, in 1844, Cahours discovered the nature of the oil procured from *Gaultheria procumbens*, showing it to be a compound of salicylic acid. In 1874 Kolbe described a method for economically preparing synthetic salicylic acid from phenol. In 1876 Striker called attention to the remarkable curative action of salicylic acid in the treatment of acute articular rheumatism, and in 1877 Germain Sée communicated a memorable paper to the Academie de Medecine in Paris, treating of the uses of salicylic acid. Even at that time various distressing symptoms were noted following the administration of salicylic acid, but neither then, nor indeed until some time later, was it generally known that the synthetic acid derived from phenol contained poisonous cresylic acids—the untoward effects being accounted for as the natural effects of the remedy, then comparatively new and little understood. To-day it is becoming more and more an accepted fact in medicine that synthetic salicylates cannot safely be employed internally, and that true salicylates from natural oil of wintergreen or birch are alone fit for use as medicinal agents. Mr. Merrill interestingly describes the methods of producing the natural oils from the leaves of *Gaultheria procumbens* and from the bark of *Betula lenta*, showing by illustrations and explaining the primitive method still in vogue in the birch-bark districts, the methods of isolating the acid from these oils, the characteristics of the oils, and of the acid obtained from them.—Pract. Drugg., January, 1911, 23–26.

Salicylic Acid—Method of Estimation by Aid of Distillation.—N. C. Cassal observes that the usual methods by which salicylic acid is extracted with chloroform or ether, and subsequently shaken out with ferric chloride solution, are open to objection by reason of the simultaneous extraction of coloring matters or of substances other than salicylic acid, which give a coloration with ferric chloride. The method now proposed by the author is designed to get over the difficulties referred to. A measured volume of the wine, syrup or other liquid containing salicylic acid is run into a separator, rendered strongly acid with a few drops of hydrochloric acid, and extracted three times with 20 to 30 Cc. of chloroform. Any emulsion formed may be disregarded. The separated chloroform, emulsion and all, is placed in another separator and washed once with an equal bulk of water to remove any alcohol present, and then extracted by shaking with about 25 Cc. of water rendered alkaline with a few drops of

normal sodium hydroxide, three times. The alkaline extracts are run into a 100-Cc. flask, acidified with a few drops of phosphoric acid, and then diluted to the mark with water. The acid solution is transferred to a distilling flask, and distilled into a 100-Cc. flask containing 10 Cc. of water. When the 100-Cc. mark is reached by the distillate the latter is well mixed, and the salicylic acid determined in an aliquot portion by the usual colorimetric method. The amount of acid formed in the *total* distillate multiplied by the factor 5.5 gives the amount of acid present in the volume of wine originally taken. The standard salicylic acid solution is prepared by dissolving 1 Gm. of the acid in alcohol and diluting to 100 Cc., and then diluting 10 Cc. of this to 1 litre. The iron solution is made by dissolving 0.25 Gm. of iron alum in water, diluting to 100 Cc., and 10 Cc. taken for each estimation. The solution must not be allowed to stand too long after the color has developed, as decomposition of the iron salt takes place, producing a brown color and turbidity.—Chem. News, 1910, 289.

Salicylic Compounds—Comparative Therapeutic Value.—From experiments on absorption and elimination performed with salicylic acid, sodium salicylate, aspirin, salol, salipyrine, and benzoalin, Dr. Pinezower finds no difference to exist in the therapeutic value of these preparations. They may be selected indifferently for administration; the only points which need be considered are the taste and the action on the digestion. In all the experiments the equivalent of 1 Gm. of salicylic acid was administered to patients suffering from such affections as acute rheumatism, lumbago, and similar complaints, but free from grave organic affections. The conditions of diet and the times of dosing were the same in all cases; the period of elimination by the urine was carefully noted. A few slight variations, probably due to idiosyncrasy, were observed, but all the differences were so slight as to be negligible.—Pharm. Journ. and Pharmacist, Feb. 25, 1911, 249; from Therap. Monatsh., 1910, through Nouv. Rem., *28*, 1910, 8.

Bismuth Salicylate—Detection of Subnitrate Present..—According to Carron au Raguet, bismuth salicylate nearly always contains some subnitrate which may be detected and determined by the following method: 0.5 Gm. of the salicylate is treated with about 50 Cc. of a dilute solution of soda (e. g., $\frac{N}{10}$); boiled for five to ten minutes, made up to 100 Cc., and filtered. A known volume of the filtrate (5, 10, 50 Cc., according to the supposed content of nitric acid) is evaporated on the water-bath; the residue, which contains a certain quantity of sodium salicylate besides any nitrate, is mixed intimately with 1 Cc. of pure sulphuric acid, and then 10 Cc. of water and 10 Cc. of ammonia added. The color obtained is compared with that produced by the residue of evaporation of a nitrate solution of known strength treated with 1 Cc. of a 1 per cent. solution of sodium salicylate, under the same conditions.—Pharm. Journ. and Pharmacist, May 20, 1911, 671; from Rep. de. Pharm. March 10, 1911, 99.

Basic Bismuth Salicylate—Preparation.—After experimenting with different processes, M. Nymann and R. Bjorksten recommend the following simple method for the preparation of basic bismuth salicylate, which is based on that originally suggested by Fischer and Grützner: The calculated quantities of bismuth hydroxide and salicylic acid are treated together (with water?) with constant stirring until a crystalline magma results, which is well washed and dried. Experiments conducted in the Pharmaceutical Institute of the University of Helsingfors, lead the authors to the conclusion that the process is easily carried out, and, aside of being economical, yields an excellent product.—Pharm. Zentralh., lii (1910), No. 16, 423–428.

Acetyl-Salicylic Acid—Preparation and Properties of Some of its Salts.—S. Fränkel observes that while acetyl-salicylic acid has come into very wide therapeutic use, it has the disadvantage of insolubility, and attempts have therefore been made to utilize some of its salts which are free from this objection. But the preparation of the salts of this acid is not a simple matter, as contact with alkali rapidly hydrolizes it. The sodium salt is prepared by adding a solution or suspension of the acid in methyl alcohol or slightly aqueous acetone to solid sodium carbonate, filtering, and precipitating the salt from the filtrate with ether. It possesses the disadvantage of being extremely hygroscopic, and its solutions become hydrolyzed fairly rapidly. The lithium salt, known as Hydropyrin L., is much less hygroscopic than the sodium salt, but still sufficiently so to require to be handled in a dry room and to be enclosed in wax paper; its aqueous solution undergoes gradual hydrolysis. The calcium salt is not at all hygroscopic, and is easily soluble in water, but almost insoluble in organic solvents. It is a white, practically tasteless, powder; analysis of the air-dry salt showed it to contain two molecules of water. The aqueous solution is practically neutral when first made, and hydrolysis does not proceed rapidly. The salt comes on the market under the name Kalmopyrin. —Pharm. Journ. and Pharmacist, Oct. 28, 1911, 561; from Pharm. Post, Aug. 18, 1911, 679.

Lithium Acetylsalicylate—Preparation, Properties and Test.—G. Mossler states that lithium acetylsalicylate, which is chemically identical with "Hydropyrin," may be prepared by dissolving acetylsalicylic acid in an organic solvent, neutralizing it with lithium carbonate, and precipitating the salt with ether. It is a white, almost odorless powder with saline bitter taste; very easily soluble in water (1 in 6.5), insoluble in ether; the aqueous solution is just perceptibly acid in reaction. The salt is only slightly hygroscopic, but as it undergoes decomposition in moist air it must be kept in a well-closed bottle. It may be identified by the following reactions: A drop of ferric chloride solution added to a 1 in ten watery solution of the salt gives a reddish-violet flocculent precipitate; if 0.2 Gm.

is boiled with about 4 Cc. of alcoholic potash, and strong sulphuric acid added drop by drop, the odor of ethyl acetate can be observed; the salt gives a characteristic red color to a Bunsen flame, and the acid formed by its hydrolysis shows the characters of salicylic acid. To determine the proportion of lithium contained in it, 1 Gm. is ignited at a low temperature, sulphuric acid then added, and small quantities of nitric acid, heating until the acid is white and fumes of sulphuric acid cease to be evolved; not less than 0.29 Gm. of lithium sulphate should be obtained, corresponding to 3.70 per cent. of lithium, the calculated quantity being 3.76 per cent. The proportion of salicylic acid should be 74 per cent. (calculated 74.19); it may be determined by boiling 1 Gm. with alcoholic potash for half an hour under a reflux condenser, distilling off the alcohol, acidifying and shaking out three times with ether; the mixed ethereal liquid is evaporated and the residue dried at 100° C. for ten minutes. 1.0 Gm. dissolved in 20 to 30 Cc. of neutral alcohol and phenolphthalein added should not require more than 0.3 Cc. of seminormal alkali to neutralize it (=acid value 8.4); on then adding a further 20 Cc. of seminormal alcoholic potash, boiling for half an hour under a reflux condenser and then titrating back with seminormal hydrochloric acid, not more than 9.6 Cc. should be required (=ester value 291.2; calculated value 301); if the salt is partly decomposed the acid value will be too high, and the ester value correspondingly too low. The maximum single dose of lithium acetylsalicylate is 1 Gm. and the maximum daily dose is 5 Gm.—Pharm. Journ. and Pharmacist, Oct. 8, 1910, 438; from Ztschr. d. allgem. Oesterr. Apoth. Verein., Aug. 27, 1910, 345.

Diiodosalicylic Acid—Preparation, Properties and Tests.—According to G. Mossler, diiodosalicylic acid, $C_6H_2I_2(OH)COOH$, may be prepared as follows: Salicylic acid in alcohol solution is heated with the calculated quantities of iodine and hydriodic acid, and the product converted into the sodium salt by heating with sodium carbonate; the sodium salt of monoidosalicylic acid, which is also formed to some extent, is more soluble and remains in solution, and the less soluble diiodo-compound is separated and decomposed by hydrochloric acid. Diiodosalicylic acid is a whitish powder with a faint yellowish tinge, having a sweetish taste and a peculiar odor recalling iodoform; very little soluble in cold water (1 in 1500), more freely in hot water (1 in 660), easily soluble in alcohol, ether and chloroform; when heated, decomposition occurs at about 220° C. It may be identified by the violet color which an aqueous solution gives with ferric chloride, the presence of iodine being shown by heating 0.1 Gm. with 4 or 5 Cc. of dilute sulphuric acid, cooling and shaking with 2 or 3 drops of potassium nitrite solution and 2 Cc. of chloroform, when the latter should acquire a violet color. Iodine in inorganic combination is shown to be absent by shaking 0.2 Gm. with 5 Cc. of dilute sulphuric acid, filtering, and adding silver nitrate, when not more than an opales-

cence should be produced. No ash should remain on igniting. The maximum single dose of the substance is 1 Gm.; the maximum daily dose, 4 Gm.—Pharm. Journ. and Pharmacist, Oct. 15, 1910, 465; from Ztschr. d. allgem. Oesterr. Apoth. Verein, Aug. 27, 1910, 345.

Methylenedisalicylic Acid—Preparation and Properties.—According to E. Clemmensen and A. H. C. Heitman, methylenedisalicylic acid ($C_{15}H_{12}O_6$) may be prepared by mixing 32 Gms. of salicylic acid, 10 Gms. of formaldehyde (40 per cent.) and 180 Gms. of 50 per cent. sulphuric acid, and gently boiling the mixture for ten hours under a reflux condenser. The product is powdered, washed with cold water, and finally several times with boiling water to remove any uncondensed salicylic acid, collected, and dried. The yield, by this method, is theoretical. The acid is a white powder of strong bitter taste, and melting at 238° C. with decomposition. It does not appear to be obtainable in good crystalline form. It is readily soluble in ether, acetone, alcohol, ethyl acetate, glacial acetic acid, slightly in hot water, and insoluble in benzene, chloroform, carbon disulphide, and petroleum ether. From solutions in alcohol, acetone, and glacial acetic acid, it is imperfectly precipitated on addition of water. Its aqueous solutions are colored blue by ferric chloride. Heated above the melting point or with caustic alkalies, it is decomposed into hydroxyphenylmethylenesalicylic acid, methylenediphenol, and carbon dioxide. Alkali and alkali earth carbonates are readily decomposed by it, forming soluble salts, none of which has been obtained in distinct crystalline form. They are precipitated from concentrated solutions on addition of alcohol or sodium chloride. The salts of the heavy metals, made by double decomposition of the soluble salts, are obtained as insoluble colored precipitates. Methylenedisalicylic acid, when precipitated from a soluble salt with a mineral acid, separates in gelatinous form, particularly if the solution is warm.—Pharm. Journ. and Pharmacist, June 19, 1911, 773; from Journ. Amer. Chem. Soc., May, 1911, 733.

Tannin—Determination by Means of Casein.—According to M. Nierenstein, the tannin in barks and fruits can be determined by means of casein, the results being 1 to 1½ per cent. higher than those obtained by the use of hide powder. Tests made with pure tannin and mixtures of tannin with glucose and gallic acid showed that neither of the latter interferes, the amount of tannin found being from 99.36 to 100.8 per cent. of the weight taken. The quantity of fat-free casein taken for 100 Cc. of liquid was 6 Gm., and the two were shaken together for ten minutes; a further 3 Gm. of casein was then added, the mixture filtered, and the analysis continued in the same way as when hide powder is used.—Pharm. Journ. and Pharmacist, April 15, 1911, 499; from Chem. Ztg., Jan. 10, 1911, 31.

Tartaric Acid—Estimation as Calcium Racemate.—Reviewing the ob-

jections to the ordinary methods of estimating tartaric acid in wines, A. Kling proposes a new method, based on its conversion into racemic acid, and the fact that racemic acid is completely precipitated by salts of calcium in weak acetic medium. Calcium racemate $(C_4H_4O_6)_2.Ca_2.8H_2O$, crystallizes in fine needles showing colored reflections. It is practically insoluble in water, in dilute acetic acid, in solutions of alkaline tartrate, in dilute and cold solutions of ammoniacal salts, as well as in solutions of calcium acetate, but dissolves easily in dilute mineral acids and in solutions of caustic alkalies—the hot diluted sulphuric acid solution reducing potassium permanganate. The author gives the details of his method, which is somewhat complicated, requiring the preparation of five distinct solutions for the reaction, for which the formulas are given.—Pharm. Journ. and Pharmacist, Sept. 3, 1910, 321 ; from Annal. des Falsif., 1910, 239.

Uric Acid—Simple Method of Estimation in Urine.—Dr. Aufrecht describes in detail a simple method for the estimation of uric acid in urine, which consists in concentrating the urine by evaporation, treating it with saturated solution of ammonium chloride, collecting the precipitated ammonium urate by centrifugation, and then titrating the urate with permanganate. In case the urine contains coagulable albumen, it is first acidified with acetic acid, boiled, and filtered before concentration—25 Cc. of the filtrate sufficing to carry out the details of the method.—Pharm. Ztg., lvi (1911), No. 37, 374 ; from Berl. Klin. Wschr., 1911, No. 14.

Valerianic Acid—Preparation, Properties and Tests of Purity.—G. Mossler observes that valerianic or isovalerianic acid (isopropyl-acetic acid) $(CH_3)_2:CH.CH_2.COOH$, may be obtained from valerian root by distillation with water, or by oxidation of amyl alcohol with bichromate and sulphuric acid ; the distillate is neutralized with soda and evaporated, the acid liberated with sulphuric acid and distilled off. It forms a clear, colorless, oily liquid, with a strong valerian-like odor, and sharp burning taste, soluble with difficulty in water (1 in 30), miscible in all proportions with alcohol, chloroform or ether ; acid in reaction ; sp. grav. 0.936 to 0.938, the hydrate, $C_5H_{10}O_2.H_2O$, having sp. grav. 0.950 ; boiling point 170° to 175° C., the hydrate boiling at 165° C., and normal valerianic acid boiling at 185° C. ; the presence of another isomer, methyl-ethyl-acetic acid, in isovalerianic acid does not alter the boiling point, but this acid is dextrorotatory. In addition to its odor and physical constants, isovalerianic acid may be identified by the following test : A little of the acid is added drop by drop to a mixture of equal parts of water and solution of ammonia, with shaking, as long as it dissolves ; on then adding a few drops of ferric chloride solution a brown-red precipitate is formed, which clots together on shaking ; the liquid should not be reddish, and should have very little color at all, showing absence of formic and acetic acids. If

1 Cc. of the acid is shaken with 25 Cc. of water the mixture should be turbid; a clear liquid shows the presence of a more soluble compound, *e. g.*, alcohol, acetic acid, or butyric acid. Butyric acid may also be tested for by dissolving 1 Gm. of the acid in 30 Cc. of water and adding 2 or 3 Cc. of copper acetate solution (1 in 10); oily drops should separate, becoming crystalline after some time, but no crystalline precipitate should be formed at once. An aqueous solution acidified with nitric acid should give no turbidity with silver nitrate or barium nitrate; 0.5 Gm. dissolved in 40 to 50 Cc. of water and 1 drop of phenolphthalein solution added, should require from 48.5 to 49.0 Cc. of $\frac{N}{10}$ alkali to neutralize it, corresponding to 99.0–100.0 per cent. of isovalerianic acid.—Pharm. Journ. and Pharmacist, Febr. 11, 1911, 175; from Ztschr. d. Allgem. Oesterr. Apoth. Ver., Nov. 26, 1910, 483.

ORGANIC BASES.

Alkaloidal Assay—Uniformity in Technic.—W. A. Pearson, in view of the reasonable expectation that much more satisfactory and accurate methods of alkaloidal assay will be inserted into the next U. S. P., points out a few differences of opinion in regard to technic that should be agreed upon before uniformity is to be expected. These embrace: (1) Amount of moisture in drugs; (2) fineness of powder; (3) temperature; (4) fumes; (5) indicators; (6) color of end point; (7) blank determinations; (8) amount of solvent; (9) identification of alkaloids; (10) physiological tests. Briefly explaining the object of these queries, the author realizes that he presents problems that can only be settled by extensive experimental work. The main practical question is to decide how great the various factors probably are, and whether the necessary co-operative work is to be undertaken.—Amer. Journ. Pharm., September, 1911, 425–427.

Assay of the Mydriatic Alkaloids—Practical Suggestions.—A. F. Sievers calls attention to some practical difficulties encountered in the assay of mydriatic drugs by the method directed in the U. S. P. Thus in the extraction of the drug the chief objection lies in the danger of loss in transferring the macerated drug from the flask to the percolator. The two operations can, however, be conducted in the ordinary separator, which can be easily transformed into a percolator in the following way: Allow the drug to settle in the apex of the funnel, securely insert the stopper, and hold the funnel in a horizontal position. Then by blowing gently through the stem and at the same time opening the stop-cock the drug will slide out of the apex in a mass. A pledget of cotton can then be easily inserted through the neck by means of a glass rod and lodged firmly in the apex. The drug is then gently shaken to insure its uniform settling in the funnel, and after allowing it to settle firmly the percolation can proceed, the flow being regulated by means of the stop-cock. Experience has

shown that by percolating in such a funnel with the amount of menstruum directed the drug will be completely exhausted.

Another difficulty frequently encountered is the formation of emulsions, which in some cases defy all known methods of overcoming them. Mr. Sievers finds that the application of a gentle heat is by all means the quickest and most efficient method for breaking up such emulsion. A simple and effective way to apply this heat is to hold the part of the separatory funnel containing the emulsion in a gentle jet of steam. The funnel must be slowly twirled and not allowed to get warm enough to boil the chloroform. It will be found that by this means emulsions which would otherwise stand for days unchanged can be broken up in a very few minutes. Again, in case of recalcitrant emulsions formed by shaking the original ether-chloroform extract with acidulated water, the author has found that the most expedient way out of the difficulty is to draw the emulsion off into a small beaker and place it in a warm water-bath. The ether and chloroform will soon evaporate, leaving the extractive matter floating on the acid water in collected lumps. The water can be readily poured off and the extract left in the beaker, thoroughly washed, and exhausted with more acid water.—Merck's Rep., Aug., 1910, 215.

Alkaloidal Assay Methods of the U. S. P. is the subject of review and discussion in a paper by Wilbur L. Scoville, which appears in "Proceedings," 1910, 818–824.

Assay Processes of the U. S. P. are reviewed and discussed by A. B. Lyons in "Proceedings," 1910, 824–829.

Assay Processes (for Opium, Nux Vomica and Cinchona) of Some of the Newer Pharmacopœias, are described in detail by A. R. L. Dohme and H. Engelhardt, in "Proceedings," 1910, 829–852.

Assay of Belladonna Plaster and Extract is the subject of a paper by A. H. Clark, in "Proceedings," 1910, 852–856.

Assay Processes—the distribution of alkaloids between immiscible solvents and its bearing upon the same—is the subject of a paper by Atherton Seidel, which appears in "Proceedings," 1900, 1031–1035.

Alkaloids—Method of Volumetric Estimation Prescribed in Pharm. Germ. V.—In a review of the directions of the Pharm. Germ. V for the volumetric estimation of alkaloids, Dr. R. Gaze observes that the shaking out of the original alkaloid solution with hydrochloric acid of 1–2 per cent. is usually not attended with any difficulty. Clarification may be hastened under circumstances by the addition of a little more acid and gentle rotation, or, in obstinate cases, by filtration through a small filter containing a little tuft of cotton. The shaking-out with chloroform, however, after rendering the acid extraction alkaline, sometimes occasions considerable trouble. The chloroform separates in minute drops which will not coalesce. In such cases coalescence may be effected by carefully heating the

separatory over a water bath ; or, by using out first only a portion of the chloroform (2.5 Cc.) and, after shaking several minutes vigorously, and subsidence of the chloroform in small drops, adding 5 Cc. more of the chloroform and then gently shaking the mixture to and fro, holding the separatory in a horizontal position.—Apoth. Ztg., xxv (1911), No. 31, 301.

Alkaloids—Availability of Chloral Hydrate and Quinone as a Test.—Professor Schaer has carried out experiments with solutions of quinone in sulphuric acid and in strong chloral hydrate solution to see if either would give useful color reactions with alkaloids or other active principles. Sulphuric acid containing quinone gave a strong orange-red color with a few alkaloids, but the reaction was not distinctive, and with most alkaloids no color was obtained. Chloral hydrate solution containing quinone gave no color with any alkaloidal salts, but a color from brownish-yellow to a dirty cherry-red was obtained with many free alkaloids ; this, however, appeared to be due to the alkalinity of the alkaloid accelerating oxidation of the quinone, and the results were not distinctive. The precipitates given by alkaloids with Mayer's solution are usually soluble in strong chloral hydrate solution, but not when the strength of the latter does not exceed 30 per cent. ; it is suggested that when a very small quantity of a drug is to be tested for alkaloid it should be macerated in 30 per cent. chloral hydrate solution for an hour or so, the great penetrating power of the solution making it very suitable for the purpose ; to the liquid is then added some Mayer's solution containing 30 per cent. of chloral hydrate, when precipitation will occur if alkaloid is present.—Pharm. Journ. and Pharmacist, Nov. 25, 1911, 711 ; from Pharm. Post, Oct. 10, 1911, 835.

Alkaloids—Reliable Colorimetric Estimations for Morphine and Colchicine.—R. Fabrinyl recommends for the colorimetric determination of *morphine* the reaction described by Radalesca, which depends on the development of a rose to ruby-red color, according to the amount of morphine, when a colorless solution of the latter is acidified with H_2SO_4 and treated with a fragment of sodium nitrite, rendering the liquid alkaline towards the end of the elimination of gas product by the reaction. For comparison a normal solution is prepared as follows : 0.3 Gm. of morphine is dissolved in 1 liter of 10 per cent. dilute sulphuric acid. Of this standard solution, portions of 9, 7.5, 7, &c. Cc. are each adjusted with 10 per cent. dilute H_2SO_4 to 10 Cc., a fragment of sodium nitrite is added to each portion, followed by 10 Cc. of potassium hydroxide, and the volume of each is adjusted to 100 Cc. with water. In this way solutions are obtained for colorimetric comparison, which, examined by means of a Krüss-Limmer-Brodhun colorimeter, gave concordant results. The colorimetric estimation of *colchicine* is based upon Zeissl's reaction. The aqueous solution of colchicine, to which some concentrated hydrochloric acid and

a few drops of diluted ferric chloride has been added, is subjected to lively boiling during 2–3 minutes. In the presence of colchicine a dark olive-green color is developed, which does not disappear on dilution with water. If this green solution is shaken with chloroform, it assumes a handsome ruby-red color. The colorimetric comparison is carried out in a manner analogous to that for morphine, and has always been found to give concordant results.—Pharm. Ztg. lvi (1911), No. 81, 820; from Chem. Ztg., 1911, No. 118.

Alkaloids—Color Reactions with Perhydrol (Hydrogen Dioxide).—In continuation of a preliminary study of the reactions of alkaloids with perhydrol (see Proceedings 1910, 360), Professor E. Schaer communicates the results of further studies on the same subject, and describes the reactions obtained with a mixture of 1 volume perhydrol (a 30 per cent. solution of H_2O_2) and 10 volumes concentrated sulphuric acid. The alkaloids so examined were: Quinine, cinchonine, cinchonidine, strychnine, brucine, opium alkaloids, hydrastine, emetine, veratrine, and nicotine. The author has also experimented with a mixture of perhydrol and hydrochloric acid, and obtained characteristic color-reactions with caffeine and theobromine. —Arch. d. Pharm., 248 (1910), No. 6, 458.

Acetanilid—Characteristic Reaction with Boric Acid.—G. N. Watson finds that when acetanilid is heated with boric acid over a naked flame until the boric acid melts, a yellow residue having a peculiar fragrant odor suggestive of sweet clover or arbutus is produced. Phenacetin also produces a yellowish color, but a faint odor, characteristic in itself, whereas antipyrin produces a pink color and a naphthalene-like odor. The reaction of acetanilid suggests a test for boric acid, the delicacy of which is worthy of investigation.—Amer. Journ. Pharm., June, 1911, 269.

Aconitine—Estimation with Silicotungstic Acid.—H. Ribaut finds that in the estimation of aconitine by the method of the Phar. Franc., with silicotungstic acid, the composition of the aconitine silicotungstate (i. e., the quantity of combined acid) depends on the conditions under which the precipitation is effected; and, furthermore, that the solubility of the compound is greater in proportion to the excess of nitric acid or silicotungstic acid, the latter dominating this effect. Under the official demands, the coefficient of M = 0.793 established by Ecalle gives satisfactory results; and here, also, a correction of the result is unnecessary, since the possible error does not amount to more than 0.2 milligrams.—Pharm. Ztg., lv (1910), No. 99, 998; from Bull. des. Scienc. Pharmacol., 1910, No. 11.

Aconitylphenetidin — Preparation, Properties and Tests.—G. Mossler states that aconitylphenitidin, which is chemically identical with "apolysin," is obtained by heating 42 p. of citric acid and 27 p. of phenetidin at from 100° to 200° C. for several hours; the loss of water which occurs causes on the one hand the formation of aconitic from citric acid, and on

the other the formation of a phenetidid. The product is purified by dissolving in soda and reprecipitating with hydrochloric acid, finally crystallizing from water or chloroform. Aconitylphenetidin is a white or slightly yellowish, odorless powder with a slightly acid taste; soluble with difficulty in cold water (1 in 55), very easily in hot water, the aqueous solution having an acid reaction; easily soluble in alcohol, ether and chloroform; melting-point 72°, or after dehydrating by long standing over sulphuric acid *in vacuo*, 129° C. The following tests serve for its identification:—0.2 Gm. is heated with 2 Cc. of strong hydrochloric acid to boiling for one minute, a few drops of phenol solution added and a little hydrochloric acid if necessary to clear the solution; on then adding 4 to 5 Cc. of solution of chlorinated lime, a violet-red color is produced, which changes to blue on adding excess of ammonia; this is the indophenol reaction. Another 0.2 or 0.3 Gm. is treated with enough lime water to make the reaction alkaline after heating and again cooling; the cooled solution is filtered and on heating the filtrate a precipitate of calcium citrate is obtained, which redissolves on again cooling. If 0.2 Gm. is boiled with 5 or 6 Cc. of strong hydrochloric acid for several minutes and a drop of ferric chloride then added, a brownish-red color is produced, and on cooling the liquid and shaking with chloroform the latter becomes colored red. The purity of the substance is shown by the melting-point, by the absence of ash on ignition and of color when dissolved in strong sulphuric acid, by the non-production of color when a 3 per cent. solution of chromic acid is added to a filtered cold-water solution (absence of phenetidin), and by a solution of 1 part in 50 of warm water remaining clear on cooling (absence of phenacetin and acetanilide). The maximum single dose is 0.5 Gm., and the maximum daily dose 3.0 Gms.—Pharm. Journ. and Pharmacist, Sept. 24, 1910, 392; from Ztschr. d. Allgem. Oesterr. Apoth. Verein., July 23, 1910, 301.

β-Amino-ethyl-glyoxaline—One of the Active Principles of Ergot, obtained by Synthesis.—Dr. F. L. Pyman has applied Gabriel's method for the preparation of glyoxaline derivatives to the production of 4-(or 5) β-amino-ethyl-glyoxaline, one of the active principles of ergot, on a commercial scale. Diaminoacetone is treated with potassium thiocyanate, and the resulting compound on removal of the sulphur yields 4-amino-methyl-glyoxaline. This is converted successively into the alcohol by means of nitrous acid, into the chloride by means of sodium hypochlorite, and into the cyanide by means of potassium cyanide. The cyanide then on reduction yields the 4-β-amino-ethyl-glyoxaline, which, as obtained by this method of synthesis, is a very reactive substance.—Pharm. Journ. and Pharmacist, April 22, 1911, 530.

Antipyrine Iron Chloride—Preparation, Properties and Tests.—According to G. Mossler, antipyrine iron chloride, identical with *ferropyrin* or

ferripyrin, is prepared by mixing a solution of 1 part of antipyrine in alcohol and ether with an alcohol solution of 1 part of crystallized ferric chloride; the precipitate is washed with ether and dried on a porous tile at a moderate temperature. It is an orange-red to a red-brown odorless powder with a slightly bitter astringent taste; soluble in water (1 in 5) to a blood-red acid liquid, which becomes almost colorless on much dilution; soluble with difficulty in alcohol (1 in 25), almost insoluble in ether and chloroform; the aqueous solution is partly decomposed on heating. The following tests serve to identify the substance and to show that it has the proper composition and purity: 1 Gm. is dissolved in 40 to 50 Cc. of water in a 100 Cc. marked flask, about 5 Cc. of ammonia solution added, and after heating for some time in a water-bath the total volume is made up to 100 Cc.; the precipitate is allowed to subside and 50 Cc. of the clear liquid is transferred to a separator and shaken out three times with ether. The ethereal solution should leave on evaporation a residue of antipyrine weighing not much more or less than 0.317 Gm. (after drying at 100° C.), and having a melting-point of 108° to 110° C.; the precipitated ferric hydroxide is collected and ignited, and the oxide so obtained should weigh not much more or less than 180.0 Gm.; chlorine may be tested for in another portion of the filtrate, which should also show no darkening with ammonium sulphide, no turbidity with barium chloride, and should leave no ash when evaporated and ignited. The original substance should show no ferrous salt when tested with potassium ferricyanide.—Pharm. Journ. and Pharmacist, Aug. 20, 1910, 277; from Zschr. d. Allgem. Oesterr. Apoth. Verein, 1910, 189.

Apomorphine Methyl Bromide (*Euporphine, Aponine*)—*Preparation and Properties.*—G. Mossler states that apomorphine methyl bromide, $C_{17}H_{17}NO_2CH_3Br$, H_2O, chemically identical with euporphine and aponine, may be made by first acting on apomorphine with diemethyl sulphate, giving methyl apomorphine methyl sulphate, and then adding a saturated solution of potassium bromide, which forms and salts out the required compound. It forms small colorless and odorless needles having a bitter taste, easily soluble in water and alcohol, almost insoluble in ether, chloroform and benzene; the aqueous solution is neutral in reaction. Melting-point 158° C.; on heating at 100° it loses half its water of crystallization and then melts at 150° C.; the preparation formerly in commerce contained one molecule of acetone in place of the water, and melted at 183°. If 3 drops of chlorine water are added to 2 or 3 Cc. of a 1 per cent. solution, a blood-red color is produced; the same color is obtained on adding concentrated, but not dilute, nitric acid. If a few drops of silver-nitrate solution are added to a solution of 0.01 Gm. in 5 Cc. of water, a brown coloration, becoming a precipitate of reduced silver, is formed after a short time. If 1 Gm. of caustic potash is moistened with water, 0.2 Gm. of methyl bromapomorphine added and the whole fused,

on dissolving the resulting mass in water, acidifying with sulphuric acid and shaking with chloroform, the latter acquires a brown color. If a saturated solution of potassium nitrite is added to a 1 per cent. solution of methyl brom-apomorphine until a permanent cloudiness is produced and a dilute acetic acid then added, a transitory red color is produced, then gas is evolved and a yellow precipitate forms, which is soluble in excess of acetic acid. A drop of ferric chloride solution added to a very dilute solution of the compound gives a transitory blue color, changing to a brown-red ; too much ferric chloride prevents the blue color being produced. In addition to the melting-point, the following tests may be used to show the purity of the substance : A 5 per cent. aqueous solution should remain clear on adding sodium bicarbonate solution. If 5 or 6 drops of sodium bicarbonate solution are added to a solution of 0.1 Gm. in 5 Cc. of water, and followed by 3 drops of an alcoholic solution of iodine, a yellow color is produced, and on shaking the liquid with ether the latter becomes yellow but not violet, showing absence of apomorphine. The absence of acetone should be shown by the iodoform test, and of mineral impurities by no ash remaining on ignition. The maximum single dose of methyl brom-apomorphine is 0.01 Gm., or 0.04 Gm. per diem.—Pharm. Journ. and Pharmacist, Nov. 12, 1910, 577 ; from Ztschr. d. allgem. Oesterr. Apoth. Ver., July 23, 1910, 302.

Atropine—Estimation with Silicotungstic Acid.—M. Javillier describes the following method of estimating atropine by means of silicotungstic acid : The atropine solution (which must not be too dilute) is acidulated with HCl to the amount of 1–2 per cent. ; a 10 per cent. solution of silicotungstic acid is then added drop by drop, rotating the liquid constantly, until in slight excess, and the mixture is set aside 24 hours. The precipitate is collected on a filter, washed with water acidulated with HCl until the washings give only a faint turbidity with atropine sulphate solution, then dried on the filter at 100° C. and incinerated. The weight of the yellowish residue multiplied by 0.4061 gives the amount of atropine, which however must be corrected by a solubility factor of the atropine silicotungstate, amounting to 0.0048 for 100 Cc. of the liquid from which the precipitate was obtained. The loss occasioned by washing the precipitate is not taken into account. The author finds that the method gives markedly lower results when applied to the estimation of alkaloid in belladonna extract than when the estimation is made by the method of the Phar. Franc., notwithstanding the fact that when atropine is added to such extract it is revealed again by the silicotungstic acid method without loss. —Pharm. Ztg., lv (1910), No. 99, 998 ; from Bull. des. Scienc. Pharmacol, 1910, No. 11.

Atropine—Detection in Association with Physostigmine and Pilocarpine. —Dr. J. Pohl finds that the detection of atropine by Vital's reaction is

vitiated by the presence of physostigmine and pilocarpine with which, for example, it may be associated in eye-drops. Taking advantage of the solubility of atropine in carbon disulphide and the insolubility of the two associated alkaloids in that solvent, the liquid to be tested is rendered alkaline and shaken out with carbon disulphide, which yields the atropine on evaporation in a condition suitable for carrying out the Vital reaction in the usual manner.—Pharm. Ztg., lvi (1911), No. 11, 106; from Therap. Monatsh., 1910, No. 12.

Betaine—Presence in Jerusalem Artichokes.—E. Schulze has isolated betaine from the tubers of the Jerusalem artichoke, 25 kilos of the material yielding about 2 Gm. of the hydrochloride of that base. The presence of asparagin in the juice of these artichokes was demonstrated several years ago.—Pharm. Journ. and Pharmacist, Sept. 17, 1910, 365; from Ztschr. Phys. Chem., *65* (1910), 293.

Caffeine—Distribution in Plants.—At the Tenth International Pharmaceutical Congress, in Brussels, Dr. Goris reviewed the present status of our knowledge concerning the occurrence of caffeine in plants. His own investigations have demonstrated that in all plants containing caffeine, this does not exist free as such, but occurs in combination with a phenolic body. Colanuts, for example, contains a crystalline body, "colatin-caffeine." If the dried substance is extracted with chloroform, no caffeine is obtained, but it is extracted if the substance is previously treated with water—the colatin-caffeine being split up by the action of the water. The colatin isolated by the author from colanuts represented a catechin derivative, which is distinct however from phloroglucin. Colatin-caffeine is readily decomposed by heat and loses on drying one molecule of water. An analogous body is contained in nuxvomica. In cola, guarana and nuxvomica, the caffeine exists in combination with a catechin group, but the caffeine contained in mate and in tea have not yet been sufficiently studied. Experiments with cacao also pointed to a tannin derivative, but different from that obtained from the previous mentioned caffeines. The author concludes that caffeine is contained in all plants as a complex tannoid, the action of which differs decidedly from that of pure caffeine, but all possess intense physiological activity.—Pharm. Ztg., lv (1910), No. 84, 849.

Caffeine—Color Reactions Suitable for Its Identification.—G. Armani and J. Barboni observe that while in examinations of coffee in the ground state the use of a microscope generally suffices for the identification of the characteristic elements; in the case of extracts, liqueurs, etc., it is necessary to discover and identify the caffeine by analytical methods. For this purpose they employ the following two reagents:

(1) *Welman's Reagent.*—Five Gm. of sodium phosphomolybdate is dis-

solved in 100 Cc. of water and 20 Cc. of nitric acid, by heating; when cool the liquid is allowed to rest and then filtered.

(2) *Moreign's Reagent.*—Ten Gm. of sodium tungstate, 100 Cc. of water, and 5 Gm. of phosphoric acid (specific gravity 1.13), are boiled together for 20 minutes, renewing the water lost by evaporation. When cold the solution is acidfied distinctly with hydrochloric acid.

The test is carried out as follows: A very small quantity of caffeine (1 or 2 Mgm.) is placed in a test-tube and solution of potassium hydroxide added; the liquid is boiled for two or three minutes. When cold the phosphomolybdic reagent is added until a white precipitate forms, and then little by little a 50 per cent. solution of potassium hydroxide until the precipitate dissolves; there is formed then an intense blue coloration like that of Fehling's solution, and which remains unaltered for several hours, when it deposits a blue precipitate while the liquid itself is colorless. With Moreign's reagent the procedure is the same, but the coloration is less intense. In the case of extracts, etc., the tests are made on the chloroformic extracts obtained from the preparation previously made alkaline with lime. Coffee substitutes give no reaction.—Pharm. Journ.and Pharmacist, Aug. 6, 1910, 215; from Rend. della Soc. Chim. Ital., 1910, 48; through Ann. de Chim. Analyt., July 15, 1910, 286.

Caffeine—Determination in Caffeine Sodio-Salicylate.—Caffeine sodiosalicylate is described in the German Pharmacopœia as containing 43.8 per cent. of caffeine, but it is only required to yield 40 per cent. by the assay process described. F. Leemann and A. Müller have therefore carried out experiments for the purpose of ascertaining how the whole of the caffeine may be extracted which showed that it is necessary to shake for one minute each time, and longer shaking than that does not increase the amount extracted; the most important condition is to make the aqueous solution alkaline with caustic alkali before extracting. A perfectly correct result may be obtained as follows: One Gm. of the salt is dissolved in 5 Cc. of water in a separatory funnel, 5 Cc. of caustic soda solution added, and 5 Cc. of chloroform; the whole shaken for one minute and then allowed to stand for five to ten minutes. The chloroformic solution is then run off and the extraction repeated three times in the same manner; the united chloroformic liquid is then to be shaken with 5 Cc. of water, the chloroform run off into a Soxhlet flask, the wash-water extracted twice with chloroform, using 5 Cc. each time, and these chloroform extracts also run into the flask. The chloroform is then distilled off the residue, dried and weighed. A simple and more rapid modification, which gives an equally correct result is to dissolve the original salt in 5 Cc. of water, add 5 Cc. of caustic soda and 40 Gms. of chloroform, and shake well for five minutes; then add 0.5 Gm. of powdered tragacanth, shake up twenty times, allow to stand five minutes, then run off 35 Gms. of chloroformic solution, evapo-

rate, dry, weigh, and calculate accordingly. The tragacanth removes all water from the chloroform, and the latter then contains nothing but caffeine.—Apoth. Ztg., xxvi (1911), No. 63, 647.

β-Choromorphid—A Concomitant of Apomorphine.—C. H. Boehringer states that the supposed trimorphine which has been found by Harnack, Frerichs, and others to be present in much of the commercial apomorphine (see Proceedings 1910, 369), has in his laboratory been identified beyond dispute as β-chloromorphid, a base (present to the amount of 75 per cent.) which is not only to be regarded as an impurity but actually antagonistic to apomorphine in its action. He therefore regards a test for its presence to be very important, and for this purpose recommends the following: "0.1 Gm. apomorphine hydrochloride is dissolved in 10 Cc. of water, 20 Cc. of ether are added, followed by 5 Cc. of a cold saturated solution of sodium bicarbonate, and the mixture is shaken until the precipitate produced is redissolved. The aqueous layer is then separated, the ether layer is washed with three portions, each 20 Cc. of water, and then evaporated in a test tube to dryness. After cooling, the residue is covered with 5 Cc. of concentrated nitric acid containing 0.5 per cent. silver nitrate, and after ten minutes the test tube is placed for an hour into a boiling water-bath. On now examining the contents of the test-tube, the clear undiluted brown liquid should be free from particles (of silver chloride), or at most of such visible on the bottom of the test tube."—Pharm. Ztg., lv (1910), No. 57, 577.

β-Chloromorphid—Formation and Characters.—Dr. Harnack and Dr. Hildebrand, having receded from their original opinion that the contaminant of commercial apomorphine is trimorphine, and accepted the view of Boehringer's chemists that the impurity is in all probability attributable to β-chloromorphid, have prepared the latter in a practically pure condition for the purpose of comparison with trimorphine. The authors mention that this chlorinated morphine derivative was first prepared several years ago by Ach and Steinbock, who determined their product to be isomeric with the chloromorphid described by other investigators some years previous, the formula of β-chloromorphine, calculated from the compostion determined, being $C_{17}H_{18}NO_2Cl$, or morphine in which an OH-group is replaced by the Cl-atom. The calculated chlorine content of the free base is 11.69 per cent., the chlorine being intra-molecular, although not too firmly united, since continuous boiling with water for several hours serves to dissolve the base by converting it into the hydrochloride of a chlorine-free base, while boiling for one hour with strong nitric acid suffices to separate the chlorine quantitatively by means of silver nitrate. Ach and Steinbock obtained the β-chloromorphid by heating a morphine solution in fuming hydrochloric acid for 13 hours in a closed vessel at 65° C. This is essentially the method employed for the production of apomorphine from

morphine, and it is therefore not a matter of wonder that apparently insignificant differences in procedure (strength of acid, time of exposure, etc.) should result in the production of β-chloromorphid along with apomorphine, thus accounting for the impure product found on the market. The result of Harnack and Hildebrand's investigation seem to prove conclusively that the impurity in commercial apomorphine is not trimorphine, but β-chloromorphid, and that the latter is a dangerous contaminant.—Pharm. Ztg., lv (1910), No. 69, 693–694.

Chloro-Urea—A New Urea Derivative.—A. Béhal and A. Detoeuf state, that when a current of chlorine is passed over urea in the cold, or at about 15°, the gas is energetically absorbed, the temperature rises, and the mixture becomes pasty. When not more than one atom of chlorine to one molecule of urea has been allowed to pass, the mass obtained gives a colorless solution in water, possessing a smell like that of hypochlorous acid, and displacing the iodine from iodides. A new urea derivative, "Chloro-urea," is formed. It is impossible to separate the constituents of the mixture by means of ordinary solvents, for they are either both insoluble or both attacked. But the chlorourea can be isolated in a state of purity by dissolving urea in water and passing in chlorine, and cooling with ice. When crystallization begins, the solution is cooled with methyl chloride, and the crystals are separated *in vacuo*. Chlorourea melts at 71°, undergoing decomposition. It is soluble in water, giving a colorless solution which slowly gives off nitrogen. It acts on saturated compounds, either as a chlorinating or as an oxidizing agent. With unsaturated compounds it gives addition products, either of chlorourea or of hypochlorous acid.—Chem. News, Nov. 17, 1911, 245; from Compt. rend., *153* (1911), No. 15.

Cocaine and Cocaine-Substitutes—Identification.—In search of reagents for the identification under police regulations of cocaine and some of its substitutes, bearing in mind the often small quantity of material (approximately 0.1 Gm.) submitted for examination, Francis J. Seiter and Frederic Enger have experimented and determined the following characteristic reactions, which, may serve for the recognition of cocaine α-eucaine, β-eucaine, stovaine, holocaine, acoine, and euphthalmine. The test solutions required are: 1 per cent. solutions of gold chloride, platinum chloride, and potassium permanganate; 5 per cent. solution of chromic acid; saturated chlorine water. The alkaloids, according to kind and reagent, were 2 per cent., 1 per cent. and 0.33 per cent. hydrochloric acid solutions—2, 3 or 5 drops of the reagent being added to 0.5 Cc. of the alkaloid solution, except in the case of chlorine water, of which 2 Cc. was added to 1 Cc. of 1 per cent. solution of alkaloid. The results, depending on certain details in manipulation, are as follows:

Reagent.	Cocaine.	α-Eucaine.	β-Eucaine.	Stovaine.	Holocaine.	Acoine.	Euphthalmine.
$AuCl_3$...	*Fern-like* crystals.	*Twig-like* crystals.	*Amorphous* ppt.	*Branched* crystals.	*Amorphous ppt.*	*Amorphous ppt.*	*No ppt.*
$PtCl_4$ ...	*Feathery* crystals.	*Fine needles.*	*Leaves, cubes* and *rosettes.*	*No ppt.*	*Small stars.*	*Amorphous ppt.*	*No ppt.*
$KMnO_4$..	*Violet-red squares.* Slow reduction.	*No crystals.* Slow reduction.	*No crystals.* Slow reduction.	*No crystals.* Slow reduction.	*No crystals.* Immediate reduction.	*No crystals.* Immediate reduction.	*No crystals.* Immediate reduction.
H_2CrO_4 .	*Fine needles.* No reduction.	*No crystals.* Slow reduction.	*No crystals.* No reduction.	*No crystals.* No reduction.	*No crystals.* No reduction.	*No crystals.* Brown ppt. and solution.	*No ppt.*
Chlorine water .	*No ppt.*	*Milky turbidity.*	*Dense turbidity.*	*Light turbidity.*	*Yellow turbidity.*	*Maroon ppt.* and claret solution.	*No ppt.*

The paper is illustrated with microscopic plates showing cocaine chloroplatinate, cocaine chloraurate, and cocaine permanganate fields under × 100 diameters.—Amer. Journ. Pharm., May 1911, 195, 201.

Cocaine—Estimation in Sterilized Solutions.—Max Nymann and R. Bjorksten find that cocaine may be estimated in its solution by precpitation with platinum chloride as follows: To 20 Cc. of the solution (= 0.2 Gm. cocaine hydrochloride) 2 Cc. of hydrochloric acid (sp. gr. 1.125) and sufficient solution of platinum chloride are added, followed by three times the total volume of alcohol. The mixture is allowed to stand until the precipitate has subsided, which is then collected on a tared filter, dried, and weighed. A correction of + 0.022 per cent. must be made for the solubility of the cocaine-platinum chloride $(C_{17}H_{21}NO_4HCl_2).PtCl_4$. The method is particularly adapted for controlling the degree of decomposition of sterilized solutions, and is not interfered with very markedly by the presence of boracic acid. On the other hand, sodium chloride prevents the complete precipitation of the double salt; nor can the method be applied to mixtures of cocaine hydrochloride and atropine.—Pharm. Zentralh., *52* (1911), No. 4, 71–74.

Cocaine—Improvement of the Permanganate Test.—The behavior of cocaine with potassium permanganate was first described by F. Giesel (see Proceedings, 1886, 611), who found the crystalline cocaine permanganate produced to be very stable compared with the corresponding salts of most alkaloids. Unfortunately, under the conditions of the test, a compara-

tively large quantity of cocaine is required, and where small quantities are in consideration it has been abandoned in favor of gold and platinum chloride tests described in the preceding paper. Francis J. Seiter, of the Department of Health, Chicago, has now made successful studies to increase the delicacy of the permanganate reaction, which, as carried out in the municipal laboratory, is as follows: To 1 Cc. cocaine solution add 1 drop of 25 per cent. sulphuric acid and 1 Cc. saturated permanganate solution. After standing some time, a drop of the liquid is removed to a slide, cover-glass adjusted, excess of liquid removed and a drop of water drawn under the cover-glass by means of a piece of filter paper placed on the opposite side. The slide is then examined under the microscope for the characteristic violet-red rectangular plates of cocaine permanganate. Working in this manner, the author detected cocaine in a solution which contained 0.00033 Gm. cocaine hydrochloride (= 1 : 3000). Under the same conditions—

a-Eucaine yielded irregular masses of violet-red leafy crystals in a 1 per cent. solution. In high dilution (1 : 600) the crystals were better formed, and resembled those of ammonium-magnesium phosphate. The limit of formation of *a*-eucaine permanganate crystals is 1 : 5000.

β-Eucaine yielded in 1 per cent. solutions minute violet-red globules, which did not crystallize on standing, but not with lesser concentrations.

All other cocaine substitutes and common natural alkaloids when treated by this test were instantly oxidized, while the true eucaines reduced the permanganates very slowly.—Amer. Journ. Pharmacy, June, 1911, 265–268.

Codeine Guaiacolsulphonate — Preparation and Properties. — G. L. Schäfer has patented a method whereby phenolic sulphonates of various opium alkaloids are obtained in form of handsome, odorless crystals. So, for example, to prepare the codeine salt of o-guaiacolsulphonic acid, the guaiacol is first converted into the sulphonic acid by the action of concentrated sulphuric acid, the alkali salt of the sulphonic acid is isolated, and this is transformed into the codeine salt by double decomposition with codeine acetate. Codeine o-guaiacolsulphonate melts at 164–165° C.; it is difficultly soluble in cold water, but readily soluble in hot water, its solution giving the characteristic blue color with ferric chloride.—Pharm. Ztg., lv (1910), No. 81, 817–818.

Codeine Methyl Bromide—Preparation.—According to K. Schuster, codeine methylbromide, $C_{18}H_{21}NO_3.CH_3)Br$, chemically identical with Eucodin, may be prepared by first making the dimethyl-sulphate addition-product of codeine, and then evaporating this to dryness with a metallic bromide, and extracting with alcohol, acetone, or methyl alcohol. It occurs as a white odorless powder, having a sweetish-bitter taste, easily soluble in water, with some difficulty in alcohol, and almost insoluble in

ether and chloroform; melting point, about 260°. Numerous tests of identity and quality are given by the author.—Pharm. Journ. and Pharmacist, Sept. 16, 1911, 384; from Ztschr. d. Allgem. œsterr. Apoth. Ver., July 15, 1911, 295.

Colatein (*Kolatein*)—*A New Constituent of Kola-nuts.*—A. Goris describes a new phenol-like constituent of fresh Kola-nuts, which he obtained during the isolation of kolatin with which it occurs associated and is separated by its insolubility in ether, in which kolatin is soluble. By several recrystallizations the new body, which the author has named kolatein, was obtained in a pure condition, leaving no residue on combustion. It does not liberate carbonic acid from $KHCO_3$, is precipitated from its solutions by lead acetate, gives a green color with ferric chloride and its solution becomes violet-red on addition of ammonia. Kolatein is soluble in hot water, more sparingly in cold water; also soluble in alcohol, acetone and wood spirit, but insoluble in ether, chloroform, petroleum ether and xylol. From its aqueous solution it crystallizes with water of crystallization, which, however, it loses rapidly in drying, and in this respect resembles phloroglucin, with which it has various reactions in common. It differs however from phloroglucin by its bitter taste, its coloration (green) with ferric chloride, and its melting point, which is 257°–258°. In its chemical relations it apparently belongs to the group of catechins.—Pharm. Ztg., lvi (1911), No. 29, 294; from Bull. des Scienc. de Pharmacol., 1911, No. 3.

Colchicine—Toxicological Detection.—According to H. Fülmer, the toxicological detection of colchicine is accomplished most satisfactorily by a combination of chemical and biological tests. From 3 to 5 Cc. of the liquid to be tested are treated with 5 drops of diluted hydrochloric acid and the test-tube is suspended during about half an hour in a boiling water-bath. Ferric chloride is then added drop by drop so long as the green color thereby produced is deepened. After cooling, the mixture is shaken with 1 to 2 Cc. of chloroform, which assumes a yellow to garnet-red color, depending on the quantity of the colchicine present. For the biological determination of small quantities of colchicine white mice are recommended, 0.1 Mgm. causing their death, accompanied by diarrhea, within 24 minutes. The colchicine immunity of frogs may be annuled by heating—0.1 Mgm. of colchicine sufficing to cause the death of water-frogs at a temperature of 30–32° C. in two to four days.—Pharm. Ztg., lv (1910), No. 92, 929; from Arch. f. experim. Pathol. u. Pharmakol., 1910, 357.

Colchicine — Colorimetric Determination.—R. Fabinyi's experiments demonstrate that Zeissl's color test for colchicine can be used for the colorimetric estimation of small quantities of that alkaloid. The test consists in adding to the liquid containing colchicine some strong hydrochloric acid, and a few drops of dilute ferric chloride solution, and boiling

briskly for two to three minutes. A dark olive-green color is produced, which does not disappear on dilution. If the green liquid is shaken with chloroform it becomes a fine ruby-red.—Pharm. Journ. and Pharmacist, Nov. 18, 1911, 667; from Chem. Ztg., Oct. 3, 1911, 1099.

Corycavidine—A New Corydalis Alkaloid.—J. Gadamer has isolated from the so-called "amorphous" alkaloids, derived from *Corydalis cava*, a new crystalline base, which he has named corycavidine, and to which he assigns the formula $C_{22}H_{25}O_5N$. It crystallizes from a mixture of alcohol and chloroform, in colorless, transparent crystals containing about one molecule of chloroform of crystallization. Exposed to the air these effloresce and then melt at 212° to 213° C., being converted thereby (at 209° C.) into an optically inactive base, melting-point 193° to 195° C., probably iso corycavidine. Corycavidine gives a reddish-yellow solution with strong sulphuric acid, which turns greenish-gray on heating. It gives an olive-green with Froehde's reagent; a dirty reddish-brown with Mandelin's reagent. It forms a crystalline nitrate, and hydrochloride; the aurichloride, $C_{22}H_{25}O_5N.HCl.AuCl_3$, is a red powder, which sinters at 80°, and decomposes at 170° C.—Arch. de Pharm., *249*, 1911, No. 1, 30.

Cupferron—Use in Quantitative Analysis.—Cupferron, the name given to the ammonium salt of *nitrosophenylhydroxylamine*, $C_6H_5N(NO)ONH_4$, is recommended for the quantitative precipitation of copper and ferric iron. An exhaustive investigation by R. Fresenius shows that this method is suitable for the determination of ferric iron in presence of aluminium, chromium, manganese, nickel, cobalt, zinc, and the alkaline earths. It thus offers a good method for the determination of iron in weighed iron and aluminium hydroxide precipitates, and also in iron and aluminium phosphate precipitates. For the determination of copper, the solution is acidified with acetic acid, and precipitated with cupferron solution in presence of ammonium acetate. The precipitate is filtered off, washed, dried, ignited with sulphur in a current of hydrogen, and the residue of cuprous sulphide weighed. This method for the determination of copper gives excellent results, provided that lead and bismuth are absent.—Pharm. Journ. and Pharmacist, March 11, 1911, 333; from Ztschr. Analyt. Chem., *50* (1911), 35.

Cupreine—New Reaction.—G. Denigès, describes the following new reaction which is due to the phenolic character of cupreine: On adding 1 Cc. of solution of ammonia to 10 Cc. of a 0.2 per cent. solution of cupreine sulphate, then 1 Cc. of hydrogen peroxide, 1 volume, and lastly, after shaking, 0.1 Cc. of cupric sulphate solution, 3 or 4 per cent., a fine green color is soon developed on mixing. This deepens in time, and a turbidity appears. This insoluble substance may be redissolved by adding alcohol or a little acid, the clear solution being of an intense emerald-green color. The green tint is changed to reddish-yellowish by a large excess

of sulphuric acid. The reaction is very sensitive. It may be obtained with solid cupreine salts by first moistening them with a drop of the following reagent:—Cupric sulphate solution, 3 to 4 per cent., 1 Cc.; ammonia solution, 5 Cc.; distilled water, 10 Cc. After mixing this with the salt, hydrogen peroxide, 0.5 volume, 1 drop is added. The same reagents serve to localize cupreine in plant-tissues.—Pharm. Journ. and Pharmacist, Febr. 4, 1911, 133; from Compt. rend., *151* (1910), 1354.

Ethoxy-Benzoyl-Amido-Quinoline—Preparation and Properties.—G. Mossler describes the preparation and properties of this compound as follows:—Ortho-ethoxy-ana-benzoylamido-quinoline, $C_9H_5(NH.CO.C_6H_5).(OC_2H_5)$, chemically identical with *analgen*, and also known under the names *benzanalgen*, *chinalgen*, and *labordin*, is prepared by first ethylating *o*-oxyquinoline by the action of ethyl bromide in presence of alcohol and caustic soda, then introducing a nitro-group which takes the "ana" position, reducing this to an amido group and benzoylating by means of benzoyl chloride in alkaline solution. It occurs as a white, odorless and tasteless crystalline powder, insoluble in water and almost insoluble in chloroform and ether, soluble with difficulty in cold, and easily in boiling, alcohol; acids dissolve it with production of a yellow color. It melts at 208° to 210°, and may be identified by the following tests:—A solution of 0.2 Gm. in 5 Cc. of alcohol gives a yellowish-red color with 1 drop of ferric chloride solution; a solution of 0.1 Gm. in 4 or 5 Cc. of alcohol, to which 1 Cc. of 10 per cent. alcoholic solution of potash and about 5 Cc. of ether are added, gives in a short time a yellow crystalline precipitate of the picrate; if 0.2 to 0.3 Gm. is heated in a water-bath with 1 Cc. of strong sulphuric acid until vapor is formed and water then added, the odor of ethyl benzoate can be observed. The substance should be free from chloride and sulphate, and should leave no weighable ash when ignited.—Pharm. Journ. and Pharmacist, Aug. 13, 1910, 235; from Ztschr. d. Allgem. œsterr. Apoth. Verein., 1910, 181.

Gelsemine—Derivatives.—C. W. Moore has made a chemical inquiry into the derivatives of gelsemine, $C_{20}H_{22}O_2N_2$. He finds it to be stable towards alkali hydroxides and reducing agents, but with oxidizing agents the molecule is decomposed, and no definite products have been obtained by this means. On boiling gelsemine with concentrated hydrochloric acid for some hours, three new bases are formed, which have been designated as apogelsemine, isoapogelsemine, and chloro-isoapogelsemine. Of these, apogelsemine, $C_{20}H_{24}O_3N_2$, is the chief product of the reaction, and although it cannot be crystallized, it yields well-characterized, crystalline derivatives. Chloro-isoapogelsemine, $C_{20}H_{23}O_2N_2Cl$, and its hydrolytic product, isoapogelsemine, $C_{20}H_{24}O_3N_2$, are only formed in relatively small amounts. Both these bases crystallize readily.—Pharm. Journ. and Pharmacist, July 22, 1911, 101; from Proc. Chem. Soc., *27*, No. 388, 157.

Gelseminine and Other Constituents of Gelsemium is the title of a paper by L. E. Sayre in "Proceedings," 1910, 949–958.

Gelsemoidine—A Third Alkaloid of Gelsemium.—For some years Prof. L. E. Sayre has made a series of investigations concerning the toxic alkaloids of gelsemium, the results of which have from time to time been published (since 1907) in the Proceedings of the Association. These results point to the existence of three instead of two alkaloids: (1) Gelsemine (crystalline); (2) gelseminine (uncrystallizable); and (3) an uncrystallizable alkaloid, soluble in ammonia or alkaline fluids, for which Professor Sayre has suggested the name "Gelsemoidine." During the past year his attention has been directed more especially to the study of this latter alkaloid. He has now prepared this alkaloid by a method briefly described, and attributes to it the following characters of distinction from gelseminine: Gelsemoidine hydrochloride is very hygroscopic, while gelseminine is permanent in the air. Gelsemoidine gives a different color reaction with sulphuric acid and manganic oxide from that of gelseminine. For example, this reagent with gelsemoidine gives at first a deep purple, changing in one hour to a deep blue. Gelseminine gives at first a brown changing finally to yellow—similar to gelsemine, which gives an intermediate green color. Gelsemoidine hydrochloride solution in water, on careful, exact neutralization, precipitates; a slight excess of ammonia solution redissolves the precipitate. Gelsemine, on the other hand, when thus treated will not dissolve in excess of ammonia water. Gelsemine hydrocloride goes into solution rather slowly and imperfectly when so treated with alkaline solution. That there is a very intimate relation between gelseminine and gelsemoidine there is perhaps little doubt. But certain differences do exist, which can be explained only by further study. In concluding, the author points out that commercially the similarity of the names "gelsemine" and "gelseminine" gives rise to much confusion, since the Germans have adopted the latter name for the crystalline alkaloid "gelsemine," and German dealers supply this when gelseminine is imported. In view of such confusion he recommends that the name "gelseminine" be dropped and for it be substituted "sempervirine," and we then should have as the three alkaloids *Gelsemine*, *Sempervirine*, and *Gelsemoidine*.—Midl. Drug. and Pharm. Rev., Oct., 1911, 439–441.

Hexamethylenamine—Quantitative Estimation in Urine.—F. Schröter recommends the following method for the quantitative estimation of hexamethylenamine in urine: To 100 Cc. of the urine 10 Cc. of 25 per cent. acetic acid are added (to prevent subsequent precipitation of creatinine) and the mixture is precipitated with 80 to 120 Cc. of solution of corrosive sublimate, saturated at 30° C. After subsidence, the precipitate is collected on a filter, washed with corrosive-sublimate solution, transferred to a flask with 10 to 15 Cc. of concentrated solution of sodium chloride and

digested on the water-bath. The hexamethylenamine-corrosive sublimate compound ($C_6H_{12}N_4.2HgCl_2$) is thus dissolved, while the uric acid precipitated with it remains undissolved. The solution is filtered and the mercury precipitated as oxide from the filtrate by means of potassium hydroxide. The precipitated mercuric oxid being now removed by subsidence and filtration, the filtrate is treated by Kjeldahl's method for the estimation of nitrogen and the quantity of hexamethylenamine present in the urine calculated from the figures as ascertained.—Pharm. Ptg., lvi (1911), No. 21, 210; from Arch. f. Exper. Pathol. u. Pharmacol., 1911, 161.

Katine—Therapeutic Properties.—J. Chevalier has made an interesting communication regarding the therapeutic action of katine ($C_{10}H_{18}ON_2$), the alkaloid isolated by Beitter in 1900 from *Catha edulis*. The drug contains from 1.1 to 1.25 per cent. of this base, which forms crystalline salts. It is only slightly toxic. It acts like cocaine on the nervous system, but has no local anæsthetic action. On the heart its stimulant, tonic action resembles that of caffeine. Its use is suggested as a remedy for morphinomania and similar drug habits, to allay the craving for the toxic drug.—Pharm. Journ. and Pharmacist, July 8, 1911, 35; from Journ. de Pharm. et Chim. 1911, *3*, 603.

Methylamines—New Method of Determination in Presence of Ammonia.—J. Bertheaume finds that Bresler's method of determining trimethylamines in presence of ammonia is unsatisfactory, because it depends upon the difference of solubility of the sulphates of the bases in alcohol, and this difference is only very small. A more accurate method which the author has worked out depends upon the action of chloroform on the chlorhydrates. Those of di- and trimethylamine are soluble, and they may be separated by preparing the periodides; the periodide of trimethylamine is insoluble, while that of dimethylamine is soluble. Ammonia and monomethylamine are insoluble in chloroform, and after the residue has been lixiviated with warm water the two may be separated by François's method.—Chem. News, July 29, 1910, 60; from Compt. rend., *150* (1910), No. 19.

Morphine—New Reaction.—M. Denigés describes a new reaction for morphine, which is carried out as follows: To 10 Cc. of morphine solution (which must contain at least 0.03 Gm. (per litre) 1 Cc. each of hydrogen dioxide and ammonia water are added, followed by 1 drop of a 1 to 4 per cent. solution of cupric sulphate. A rose to red color is developed, varying in intensity according to the quantity of morphine present. In this test the copper salt, however, appears to act simply as a catalysator, since a rose color—though of far less intensity—is developed by hydrogen dioxide and ammonia without the copper; but the latter cannot be replaced by any other metallic salt.—Pharm. Ztg., lvi (1911), No. 11, 106; from Rép. de Pharm., 1911, No. 1.

Morphine—Quantitative Determination of Small Quantities.—Objections having been raised to the method of Rübsamen for the quantitative estimation of small quantities of morphine, the method has been investigated by R. Gottlieb and O. Steppahn. According to this method the morphine is extracted from solutions of its salts by making just alkaline to phenolphthalein and shaking repeatedly with large volumes of chloroform, afterwards distilling off the chloroform and determining the morphine in the residue by Gordin's method. The authors find that good results can be obtained by proceeding as follows: The solution must be only just alkaline to phenolpathalein, and since the alkalinity is diminished by the extraction, more $\frac{N}{10}$ alkali is to be dropped in as required; instead of shaking with the chloroform, it is better to mix the two liquids in a beaker with a stirrer for ten minutes at a time, adding alkali as required: the chloroform should have been well stirred with pure water first, and about 600 Cc. should be used each time for extracting 200 Cc. of the aqueous liquid. After the ten minutes' stirring, the whole is transferred to a separator, and the chloroform run off, and the operation repeated three or four times. The united chloroform solution is distilled, the last portion evaporated in a dish, and the morphine dried; a known excess of $\frac{N}{10}$ sulphuric acid is then added, and enough absolute alcohol to take all into solution, and the determination concluded by Gordin's method. A number of control determinations showed that about 90 per cent. of the morphine is obtained.—Apoth. Ztg., xxv (1910), No. 105, 1054; from Arch. f. Exper. Pathol. u. Pharmacol., *64* (1910), 54.

Morphine—Colorimetric Estimation.—R. Fabinyi observes that most of the colorimetric methods which have been put forward for the estimation of small quantities of morphine depend on the liberation of iodine from an acidified solution of potassium iodate, the amount of iodine being then ascertained by colorimetric comparisons. Such a method, however, has the disadvantage that many other substances besides morphine liberate iodine from iodate, and small quantities of morphine do not cause a sufficiently intense color. The violet-blue color which morphine gives with Marquis's reagent (sulphuric acid and formaldehyde) is proportional in intensity to the amount of morphine present, but the reaction is not well suited for quantitative use, as so many organic substances cause coloration of sulphuric acid. Radulescu's reaction has proved quite suitable for colorimetric use; dilute sulphuric acid is added to the liquid to be tested, then a small fragment of sodium nitrite is dropped in, and when gas has nearly ceased to be evolved the liquid is made alkaline, when a reddish-yellow to ruby-red color is produced, according to the amount of morphine present. The colored substance which is formed is said to be nitrosoxanthranol; the color is discharged by acids, but reappears on again adding alkali. A solution was made of 0.3 Gm. of morphine in 1 liter of 10 per cent. sulphuric acid, and various quantities of this under 10 Cc. were taken, made

up to 10 Cc. with more of the dilute acid, a fragment of sodium nitrite added, followed by 10 Cc. of solution of caustic potash, and the whole diluted with water to 100 Cc. On then comparing the colors in a colorimeter the results agreed well with the amounts of morphine actually present.—Pharm. Journ. and Pharmacist, Nov. 18, 1911, 667; from Chem. Ztg., Oct. 3, 1911, 1099.

New Morphine Salts and Derivatives—Formation.—H. Wieland and P. Kappelmeir describe the conditions under which certain new morphine salts and derivatives are obtained by the action of nitrous acid or nitrites. Thus, *morphine nitrite* may be obtained readily by the double decomposition of morphine hydrochloride and sodium nitrite. *Nitrosomorphine* is obtained by passing nitrous acid into a cooled suspension of morphine hydrochloride in water. *Nitrosomorphine hydrochloride*, $C_{17}H_{18}O_4N_2HCl$, occurs in lemon-yellows crystals. The free base, $C_{17}H_{18}O_4N_2.H_2O$, is obtained by treating the hydrochloride with the exact equivalent of ammonia. It occurs in small, deep orange needles, melting at 225° C. By reducing this *2-nitrosomorphine* with tin and hydrochloric acid *2-aminomorphine* results. Its hydrochloride, $C_{17}H_{20}O_3N.2HCl$, is very soluble in water. The base itself, which crystallizes in quadratic lamellæ with one molecule of water, is very sparingly soluble. Morphine, in minute traces, gives a marked yellow color with sodium nitrite reagent. This becomes orange on adding caustic soda solution.—Pharm. Journ. and Pharmacist, Sept. 30, 1911, 437; from Liebig's Annalen, 1911, 306.

Morphine Sulphate—Presence of Foreign Alkaloids in the Commercial Salts.—H. Englehardt and H. W. Jones have examined four samples of morphine sulphate, U. S. P., procured from different manufacturers, and have found them to contain 1.45 per cent., 3.34 per cent., 2.83 per cent., and 3.97 per cent., respectively, of other alkaloids, which consisted mainly of codeine. The determinations were carried out by dissolving a weighed quantity of the morphine salt in water, rendering the solution alkaline with caustic potash and shaking the mixture with various portions of chloroform. The chloroform, after being shaken several times with small quantities of water to remove traces of suspended alkali, was evaporated to dryness and the residue titrated in the regular way.—Drug. Circ., October, 1911, 555.

Nicotine—Estimation in Tobacco Extracts.—Under the title of "The Determination of Nicotine in Nicotine Solutions and Tobacco Extracts," the Bureau of Animal Industry of the United States Department of Agriculture has issued as Bulletin 133, a study by Robert M. Chapin. Mr. Chapin reviews the various methods hitherto used, and as a result of his study gives directions for the routine analysis of nicotine solutions and tobacco extracts according to the "silicotungstate" method. The details of this method, which is reproduced in the abstract from which this is quoted, may be consulted in Amer. Drugg., May 8, 1911, 276.

Nitropyrrol—Method of Preparation.—A. Angeli and Luigi Allesandri state that, although pyrrol and its derivatives are decomposed by the action of nitric acid, nitropyrrol can be prepared by adding an atom of sodium and a molecule of ethyl nitrate to a molecule of pyrrol diluted with ether. Thus the sodium salt of nitropyrrol and sodium nitrite are formed, and may be separated by adding a solution of silver nitrate; the silver salt of nitropyrrol, which is thus prepared, together with silver nitrite, is insoluble in water, while silver nitrite is soluble. The silver salt is converted into the sodium salt by the addition of sodium chloride.—Chem. News, July 7, 1911, 11; from Atti della Reale Accademia dei Lincei.

Papaverine and Cryptopine—Reactions and Association.—According to the investigations of A. Pictet and C. H. Kramer, synthetic papaverine is not found to give the reactions which have been considered to be characteristic of that base. These are due to the presence of cryptopine. As much as 30 Gms. of the latter rare opium alkaloid has been separated from 800 Gms. of commercial papaverine. Cryptopine, $C_{21}H_{23}NO_5$, crystallises from alcohol in short transparent prisms, melting at 218° C. Its hydrochloride is very soluble in water and only sparingly dissolved by hydrochloric acid. The bichromate, in fine yellow prisms, is very soluble in water. It is a saturated base, is not attacked by nascent hydrogen, and contains two methoxyl groups. It gives a deep violet color with strong sulphuric acid, and marked color-reactions with Erdmann's, Froehde's, Mandelin's, and Labat's reagents. Pure papaverine gives no reaction whatever with any of these, nor with Lafon's and Marquis's reagents. Merck, who originally isolated papaverine, considered the bluish-violet color given with sulphuric acid to be distinctive of that base; Hesse attributed it to papaveramine, $C_{21}H_{25}NO_6$, which he found to accompany natural papaverine.—Pharm. Journ. and Pharmacist, Nov. 5, 1910, 551; from Berichte, 1910, 1329.

Phenocoll Hydrochloride—Preparation, Characters and Tests.—G. Mossler states that amidoacetphenetidine hydrochloride, identical with "phenocoll hydrochloride" (also called "phenamine," "amidophenacetin," and "glycocoll-phenetidine"), is prepared as follows: Paraphenetidin is acted on by chloracetyl chloride, giving paraethoxy-mono-chloracetanilid, and the latter is converted by the action of ammonia into the salt of amidoacetphenetidine; the base is liberated by alkali and purified by recrystallizing from water, and again converted into the hydrochloride. The salt is a colorless, odorless crystalline powder with saline bitter taste; soluble with some difficulty in water (1 in 20) to a neutral solution, easily soluble in alcohol, almost insoluble in ether and chloroform. On adding alkali to a strong aqueous solution, the free base separates in felted needles; it may be extracted by shaking with chloroform, and on separating and evaporating the chloroform and drying the base *in vacuo* it

melts at 100° C. If the salt is heated with caustic alkali it is decomposed, phenetidine and amidoacetic acid being formed; the former of these gives carbylamine when heated with chloroform and alkali, and the latter gives a red color with ferric chloride. The addition of Millon's reagent to a solution of the salt produces a white turbidity, which disappears on warming; on heating repeatedly or allowing the liquid to stand for a long time, a violet color is developed. Strong nitric acid added to a solution gives a yellow color, and after some time yellow crystals separate. The substance should be free from ammonium compounds, shown by warming a solution with alkali, and from phenetidine, detected by the red color produced on adding a 3 per cent. solution of chromic acid to a solution of the salt; it should leave no ash on ignition, should give a colorless solution in strong sulphuric acid, and should make a clear solution with 20 parts of cold water.—Pharm. Journ. and Pharmacist, August 20, 1910, 277; from Ztschr. d. allgem. Oesterr. Apoth. Verein, 1910, 231.

Phenolphthalein—Volumetric Estimation.—V. Zotier recommends the following method for the volumetric estimation of phenolphthalein, which is based on its property of forming a water-soluble compound (disodium-phenolphthalein with sodium hydroxide. The preparation (pastille, tablet, etc.) is triturated with caustic soda, then dissolved in a little water, filtered and adjusted to 50 Cc. To 25 Cc. of the filtrate, hydrochloric acid is added, drop by drop, until phenolphthalein begins to separate. This is redissolved by just sufficient $\frac{N}{10}NaOH$, and the solution is then titrated, vigorously shaking, with $\frac{N}{10}H_2SO_4$ until the color change sets in. A correction for the water-solubility of the phenolphthalein, amounting to 0.092 Mgm. per 1 Cc., at the ordinary temperature, should be made.—Pharm. Ztg., lvi (1911), No. 12, 116; from Bull. Soc. Chim. de France (4), 7, 993.

Pseudomorphine—Preparation.—Pseudomorphine (oxymorphine, oxydimorphine, or dihydrodimorphine) is very difficult to obtain in commerce, and the methods of making it which have been tried by G. Denigès are laborious, and give small yields. The author, having conceived the idea of using a mineral catalyst, finds that the double cyanide of copper and potassium, acting in presence of hydrogen dioxide, answers the purpose perfectly. He dissolves, in the heat, 5 Gms. of morphine hydrochloride in 200 Cc. of water, and allows the solution to cool; he then adds 20 Cc. of solution of hydrogen dioxide (10 to 12 vols), or an equivalent quantity of another titre, which must be quite neutral, or at least whose acidity does not exceed that of a centinormal solution. He then runs into the liquid a mixture, prepared in advance of 10 Cc. of a solution of copper sulphate (40 Gms. of the crystalline salt in 1 liter), and a quantity of a solution of potassium cyanide equivalent to $\frac{N}{10}AgNO_3$, sufficient to decolorize exactly the copper solution (about 30 Cc. will be

required). The mixture is shaken. A turbidity first appears; in less than a minute this begins to increase until a precipitate forms, at first colloidal, and then agglomerating in three or four minutes. Still later, oxygen is vigorously, disengaged, and at this moment the mixture, first yellowish, becomes redder, and a crystalline precipitate forms. After standing for an hour, the precipitate is collected on a filter and washed, first with cold water, then with alcohol, and finally with ether, and dried on the filter below 100°. The weight of pseudomorphine thus obtained represents 20 to 25 per cent. of the morphine hydrochloride used. It may be purified by dissolving 1 Gm. in 100 to 120 Cc. of solution of ammonia (22° Be), adding 5 or 6 Gms. of purified animal charcoal, boiling, filtering, and washing out the charcoal with a little water. The filtrate is evaporated on a water-bath to a small volume, preferably in a flask under reduced pressure. The alkaloid is thus obtained in extremely well-formed, small tabular crystals.—Pharm. Journ. and Pharmacist, Mar. 25, 1911, 399; from Bull de la Soc. de Pharm., Febr., 1911, 49.

Pyramidon—New Reaction.—F. Pevenasse-Dampremy finds that when a few drops of dilute solution of silver nitrate are added to a solution of pyramidon at ordinary temperatures a precipitate of metallic silver is thrown down, and the supernatant liquid assumes a blue color, which changes to reddish-violet. If excess of nitric acid is now added the precipitate dissolves with evolution of red vapors, and the reddish-violet color slowly disappears. When, on the other hand, excess of nitric acid is added to a solution of pyramidon the blue color at first produced is instantly destroyed.—Pharm. Journ. and Pharmacist, Dec. 24, 1910; from Annal. de Pharm., 1910, 385.

Pyramidon (Amidopyrine) G. P. V.—Test for Chlorides and Antipyrine.—Const. Collo finds the tests of the G. P. V. inadequate for the detection of chlorides and of antipyrine. For chlorides he recommends the phloroglucin reaction and the method of Kastle and Beatty. The *phloroglucin reaction* is carried out as follows: About 15 drops of a solution, composed of 0.2 phloroglucin and 0.2 vanillin in 100.0 ether, are allowed to evaporate spontaneously in a small porcelain dish. A little amidopyrin is then subjected to incineration in a loop of platinum wire and the combustion vapor is allowed to act on the residue in the porcelain dish. In the presence of traces of halogen acids a red ring is produced, or the entire spot is so colored in presence of larger quantities. To carry out the *Kastle and Beatty method*, a mixture of 0.1 Gm. amidopyrin and 0.2 Gm. each of pure silver nitrate and copper nitrate is heated to red-heat in a tube closed at one end. When cooled, 3–4 Cc. of diluted sulphuric acid are added to the contents of the tube, followed by a few fragments of zinc. Within 5–10 minutes the silver is completely reduced; the solution is filtered, acidulated with pure nitric acid, and tested with silver nitrate. In the

presence of halogen acid turbidity or a precipitate results. In place of the official (G. P.) method for determining the presence of *antipyrine*, the author recommends the following: Dissolve 0.1 Gm. of the pyramidon in 8–10 drops of a solution composed of 1.0 *p-dimethylamidobenzaldehyde*, 5.0 hydrochloric acid (25 per cent.), and 94.0 absolute alcohol, in a small porcelain dish with a flat bottom, and evaporate the solution in a water-bath. In the presence of antipyrine a fire-red spot or a ring results, depending on the quantity present in the sample.—Pharm. Ztg., lvi (1911), No. 20, 199; from Pharm. Post, 1911, No. 17, 173.

Quinine—New Titration Method for Its Determination.—J. Katz has devised a process for the determination of quinine in drugs and galenicals by titration. The method consists in the conversion of the free alkaloid into the diacid salt by evaporation of an alcoholic solution with hydrochloric acid and sodium chloride. The excess of acid is evaporated off, and the residue titrated with standard alkali. The author gives the following directions:—6 Gm. of dry powdered cinchona bark is shaken for half an hour with 15 Gm. of chloroform and 5 Gm. of a 5 per cent. solution of sodium hydroxide. Then 45 Gm. of ether and about 1 Gm. of magnesium oxide are added. The mixture is well shaken, and 40 Gm. of the clear chloroform-ether solution is filtered off. The ethereal liquid is reduced by distillation to about 1 Cc. the residue is washed into a capsule with three successive portions of 3 Cc. of alcohol, mixed with 10 drops of hydrochloric acid and about 0.25 Gm. of sodium chloride and evaporated to dryness on the water-bath. Towards the end of the evaporation the mass is well stirred so as to obtain the sodium chloride as a fine meal and not as large crystals, and to spread the mass thinly over the bottom of the dish. The sides of the capsule are washed with alcohol, and the evaporation repeated with continuous stirring. The dry residue is heated on the water-bath or in the steam-oven for fifteen minutes, and washed into a small Erlenmeyer flask with about 25 Cc. of alcohol. Five drops of a 0.2 per cent. solution of Poirrier's blue is added as indicator, and the liquid titrated with decinormal alcoholic potassium hydroxide. The number of Cc. of potash solution required, multiplied by 1.62 (half the molecular weight of quinine is 162) and divided by 4 gives the percentage of alkaloid in the cinchona bark. The method may be applied with suitable modifications to extract and tincture of cinchona.—Pharm. Journ. and Pharmacist, Dec. 31, 1910, 788; from Ber. d. Deutsch. Pharm. Ges., 1910, 316.

Quinine—Estimation as Acid Citrate.—The results of the estimation of quinine in organic liquids, such as urine, by direct extraction of the alkaline liquid with ether, are very unreliable, the quinine obtained being contaminated with resinous and coloring matter. To obviate this source of error, Nishi proposed a method in 1909 ("Analyst," *34*, 443) by which the

quinine, dissolved in ether, is precipitated as acid citrate by the addition of an ethereal solution of citric acid. T. Cockburn and J. W. Black now confirm the accuracy and reliability of this method by a series of estimations carried out with it, but propose a modification of the method, which render the details of the process described by Nishi less cumbersome. As claimed by Nishi, the compound formed is of constant composition, corresponding to an acid citrate having the formula $C_{20}H_{24}N_2O_2.C_6H_8O_7$, containing theoretically 62.79 per cent. of quinine, while in practice an average of 62.95 per cent. was obtained by these authors and 62.57 per cent. by Nishi. The general characteristics of the acid citrate also correspond with those given by Nishi. The compound is almost completely insoluble in ether, slightly more soluble in cold water and in alcohol, but readily soluble in hot water. Without going into the details of the method, which may be consulted in the original, it may here be stated that the impure quinine, obtained by the usual shaking-out process and completely dried, is dissolved in anhydrous ether, precipitated with a specified quantity of saturated ethereal solution of citric acid, allowed to stand 24 hours, the precipitate collected in a filter-tube, washed with specified quantities of ether, and dried to constant weight. The saturated solution of citric acid is obtained by dissolving citric acid, previously dried *in vacuo*, in anhydrous ether.—Pharm. Journ. and Pharmacist, September 16, 1911, 380–381.

Quinine and Euquinine—Chemical Relations and Distinctions..—A. Astruc and L. Courtin describe the chemical characters of relationship and of distinction of quinine and euquinine. Both bases are characterized in common by their neutral reaction with phenolphthalein ; their alkalinity to methylorange ; their property of combining with acids to form salts ; their precipitability by the general alkaloidal reagents ; the fluorescence of their solutions in oxygenous acids ; the thallioquin reaction ; and by the precipitation from their saline solutions by alkali carbonates and bicarbonates, as also by alkali iodides and benzoates. Further properties in common are the yellowing of the solutions by exposure to light, the neutral reaction of the R. H. alkaloidal salts with litmus, and the purely basic character of their salts towards phenolphthalein. The two bases, however, differ from each other in the following particulars : Quinine gives the well-known herapathite reaction ; euquinine does not. One mol. of quinine requires for neutralization, with methylorange as indicator, 1.97 mol. HCl ; euquinine requires 1.05 mol. HCl. If rosolic acid or litmus are used as indicator, 1 mol. quinine consumes 0.99 mol. HCl, while euquinine manifests only faint acid properties towards litmus. Quinine yields two kinds of salts : acid and neutral, whereas euquinine is capable of producing acid salts only.—Pharm. Ztg., lvi (1911), No. 28, 283 ; from Journ. de Pharm. et Chim., 1911, No. 6.

Neutral Quinine Hydrochloride—Rotatory Power.—The Phar. Franc. of 1908, indicates that the rotatory power of neutral quinine hydrochloride increases with the concentration of the solution examined, and gives the following figures at 15°; $a_D = -219.5°$ for an aqueous solution of which 100 Cc. contain 1 Gm. of neutral salt completely dried at 100°; $a_D = -224.6°$ for a solution of double the strength. From experiments made on various samples, which have always given concordant results, Andre and Leulier are led to a diametrically opposite conclusion, inasmuch as they find that the rotation increases with dilution. Their figures for four samples are:—Aqueous solution of 2 Gm. per 100 Cc. at 17°, $a_D = -221.66°$ to 223.50°; 1 Gm. per 100 Cc., $a_D = -224.50°$ to 226.67°; 0.50 Gm. per 100 Cc., $a_D = -229.50°$ to 231.71°. These variations are of the same kind as those noticed by most authors with solutions of alkaloidal salts, by Oudemans, Landolt, and by Hesse, in particular, with basic hydrochloride and sulphate of quinine; they find their interpretation in the hypothesis of electrolytic dissociation. The salts of alkaloids behave as demi-electrolytes; the rotatory power of their aqueous solutions increase with dilution, conformably with the rule enunciated by Van't Hoff.—Pharm. Journ. and Pharmacist, Aug. 6, 1910, 215; from Journ. de Pharm. et Chim., July 1, 1910, 22.

Quinoline Sulphosalicylate—Preparation and Properties.—G. Prunier states that quinoline sulphosalicylate, a salt which has not heretofore been made, can be prepared by acting on quinoline with sulphosalicylic acid, using molecular proportions, in the presence of water, applying slight heat finally. The salt crystallizes in white silky tufts, has an acid reaction, is slightly soluble in cold water, but very soluble in hot water and in alcohol; nearly insoluble in ether, chloroform, acetone, and cold benzene. It melts at 220° C., but at 110° there is partial fusion, and it loses a molecule of water. The 1 per cent. solution is odorless and colorless, acid to litmus, and is not precipitated by hydrochloric acid; ferric chloride gives a violet-red coloration; neutral lead acetate and calcium chloride do not precipitate it, but barium chloride produces a slight turbidity; potassium hydroxide gives no precipitate, but produces the characteristic odor of quinoline; chlorine water and ammonia give no coloration; Nessler's reagent gives a white precipitate, soluble in strong alcohol; mercuric chloride, in hot solution, gives no coloration; gold chloride gives a bright yellow precipitate, but platinum chloride none; lead subacetate gives a precipitate soluble in acetic acid. The salt itself treated with fuming nitric acid is dissolved with a very marked golden-yellow coloration on heating, even after the addition of distilled water. The toxic power is less than that of the corresponding quinine salt. Its antiseptic power is equal to that of phenol, and its bactericidal power, though less, is notable.—Pharm. Journ. and Pharmacist, July 30, 1910, 131; from L'Union Pharm., 1910, 254.

Quinine Tannate—Alkaloid Content.—The Council on Pharmacy and Chemistry of the A. M. A. describes quinine tannate as containing 29 to 35 per cent. of quinine. While on account of its insolubility it is less active and less certain than the more soluble quinine salts, the lack of bitterness renders it useful for administration to children.—Journ. Amer. Med. Assoc., *57* (1921), 1287.

Scopolamine—Caution Regarding Use.—Delbet and Dupont warn against the use of scopolamine for general anesthesia; their review of 120 cases includes 2 fatalities, one serious post-operative syncope, and a number of other mishaps.—Amer. Journ. Pharm., Oct., 1910, 485; from Journ. Amer. Med. Assoc., *55* (1910), 257.

Scopolamine—Action on Narcotics.—Experiments made by G. Haukhold on rabbits show that although scopolamine has practically no narcotic action alone, it greatly increases the physiological activity of those drugs which have this action. Small doses of urethane, and of morphine, when combined with minute doses of scopolamine, have their narcotic action increased in a remarkable degree.—Pharm. Journ. and Pharmacist, Jan. 21, 1911, 65; from Ztschr. Exper. Pathol., 1910, *7*, through Nouv. Remèd., *27* (1910), 534.

Sparteine—New Reaction.—A. Jorissen describes a new reaction of sparteine which, he thinks, should be recognized as a test for the presence of this alkaloid by the French Pharmacopœia. A few centigrams of sparteine sulphate are dissolved in as little water as possible, and a slight excess of sodium hydroxide is added. The turbid liquid is then shaken with about 10 Cc. of ether, and when the latter has completely separated it is carefully drawn off into a perfectly dry test-tube, taking particular care to exclude any of the aqueous liquid. To the ethereal solution is added 1 or 2 centigrams of dry sulphur, shaking vigorously for a minute. A current of hydrogen sulphide is then passed through the liquid, which soon produces a voluminous vivid red precipitate, which on the addition of water disappears (sparteine polysulphide?); 0.01 Gm. of sparteine sulphate suffices for the production of a distinct precipitate. No other alkaloids, fixed or volatile, nor pyridine behave in this way. With conine, however, an orange-yellow, while with atropine a yellow precipitate is produced.—Pharm. Journ. and Pharmacist, Oct. 7, 1911, 463; from Journ. de Pharm. et Chim., Sept. 1, 1911, 251.

Strychnine—Colorimetric Determination.—E. Scandolla recommends for the determination of small quantities of strychnine the comparison of the color produced with Mandelin's reagent (1 Gm. ammonium vanadate, 200 Gm. sulphuric acid), with the color given by a strychnine solution of known strength—the comparison being made with the aid of Dubrosq's colorimeter. The color is appreciably affected, however, by the presence of foreign substances, and the strychnine to be determined must therefore

be as pure as possible.—Apoth. Ztg., xxvi (1911), No. 17, 168; from Boll. Soc. Med. Chirurg. di Pavia, Dec. 16, 1910.

Strychnine—Action of Adrenaline as an Antidote.—In "Deut. Med. Ztg." it is stated that adrenaline is a powerful antidote in cases of poisoning by strychnine, the action being similar to that in the antagonism between atropine and muscarine. Combinations of adrenaline and strychnine, that are not poisonous in the guinea-pig when given subcutaneously, set up typical symptoms of strychnine poisoning when injected into the veins. From this it would appear that adrenaline delays resorption through the glands. In the frog, the heart of which has been brought to a standstill in systole by strychnine, can be brought into action again by adrenaline. There is, however, no specific antagonism; the effect is simply one of irritation, as shown by similar effects as produced by other agents—camphor, barium, strophanthin, and atropine.—Pharm. Journ. and Pharmacist, Oct. 1, 1910, 416; from Med. Press, Aug. 7, 1910.

Strychnine Arsenates—Characters and Composition.—In a note on arsenate of strychnine, D. B. Dott says that the salt $B_2H_3AsO_4$ seems to exist, but is sparingly soluble and apparently partly decomposed in presence of water. There are, however, two well-defined salts, both fairly soluble in water: one the generally recognized acid salt, $B.H_3AsO_4.H_2O$, which becomes anhydrous at 120° C., probably three-fourths of the water being driven of under 100° C.; solubility in water at ordinary temperature, 1:34. The second acid salt, $B.(H_3AsO_4)_2.H_2O$, is not so generally known. It is soluble in 16¾ parts of water at the ordinary temperature.—Though it has the advantage of greater solubility, the proportion of strychnine is, of course, much less.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 421.

Strychnine Arsenite—Composition of the Commercial Drug.—There being two formulas ascribed to strychnine arsenite: the one in "Merck's Index," 1907, $(C_{21}H_{22}N_2O_2)_2HAsO_2$, corresponding to 86.1 per cent. of strychnine; the other by Hager and others, $(C_{21}H_{22}N_2O_2)_2As_2O_3$, corresponding to 77.1 per cent. of strychnine, H. Engelhardt and H. W. Jones experimented to ascertain to which of these formulas the strychnine arsenite on the market corresponds. Samples of this salt were obtained from four of the leading manufacturers of alkaloids and duplicate determinations of their strychnine content were made in the usual way, with the following results: *A.*—75.65 and 74.9 per cent. *B.*—72.76 and 71.5 per cent. *C.*—69.2 and 71.0 per cent. *D.*—75.5 and 75.3 per cent. The results show that none of the salts correspond to either of the above formulas, but that all of them contain an excess of arsenous acid, which fact the authors have proven by actual determination of the latter.—Drugg. Circ., October, 1911, 555.

Strychnine Arsenate—its composition—is the subject of an experimental study by W. A. Puckner and L. E. Warren, which appears in "Proceedings," 1910, 1007–1013.

Strychnine Hypophosphite—Properties.—The ordinary books of reference do not describe the hypophosphite of strychnine and D. B. Dott now supplies the following description: It crystallizes with the composition indicated by $B.H_3PO_2.3H_2O$, all the water of crystallization being lost at 100° C. It is one of the most soluble of the strychnine salts, requiring 3.3 parts of water at ordinary temperature for solution.—Trans. Brit. Pharm. Conf. (Year-book of Pharmacy), 1910, 422.

Theobromine-Sodium Salicylate — Preservation.—While theobromine-sodium salicylate forms a clear solution when the compound is recently prepared, it soon fails to dissolve clear and eventually becomes only partially soluble—this being due to the action of carbonic acid from the air upon sodium theobromine, sodium carbonate and free theobromine being formed. K. Kollo has found that this decomposition is completely prevented if the container is stoppered with a cork having a chlorcalcium tube filled with soda lime, the cork itself being well paraffined, so that only air deprived of CO_2 is admitted into the interior of the container.—Pharm. Ztg., lv (1910), No. 65, 657; from Pharm. Prax., 1910, No. 5.

Theobromine-Sodium Salicylate—Practical Method of Estimation.—Referring to Anneler's method for estimating the theobromine in theobromine sodium salicylate (see Proceedings 1910, 374), Jäggi states that, while very accurate, the method is too tedious for practical purposes, and after comparative experiments with this and three other methods (Ph. H. IV, Ph. austr. VIII, and that of Siegfried), he recommends the method of Siegfried as the more practical for pharmaceutical use, the more particularly since it accomplishes the determination of both theobromine and salicylic acid, if conducted as follows:—10 Gm. theobromine-sodium salicylate are introduced into a separating funnel with about 5 Cc. of water; the mixture is acidulated with 1.2 Cc. of HCl (25 per cent.) and vigorously shaken with 15 Cc. of ether. The ether-layer is transferred to a tared beaker, and the residual aqueous portion is shaken out twice more with 10 Cc. each of ether, and added to the contents of the beaker. The united ether solutions are distilled and the residue, after drying to constant weight at 50°, calculated as salicylic acid. The theobromine, which remains suspended in the aqueous layer, is next collected on a tared filter, the separatory funnel and container being rinsed onto the filter with the smallest quantity of water practicable, and filter is then dried to constant weight.—Schweiz. Wochenschr. f. Chem. u. Pharm., xlvii (1910), No. 37, 569.

Vernine—Occurence and Properties.—E. Schulze and his pupils have succeeded in isolating the nitrogenous principle, vernine from a consider-

able number of plants. Its separation is difficult, however, on account of the small amount present. Moreover, it does not occur constantly in the plants examined, but only at certain stages of the vegetation process. It has been shown previously that when vernine is treated with dilute hydrochloric acid guanine is liberated, and the presence of a pentose was suspected among the other decomposed products. This has now been satisfactorily proved, and vernine is shown to be a guanine-pentoside. It crystallises from hot water on cooling in sparingly soluble needles or prisms, having the formula $C_{10}H_{13}N_5O_5 + 2H_2O$. The aqueous solutions afford precipitates with phosphotungstic acid, silver nitrate, and picric acid ; when heated with phloroglucinol and hydrochloric acid it gives a cherry-red color. Vernine is rapidly hydrolysed by heating with dilute acids, and guanine is easily isolated from among the other hydrolysis products. It is possible that vernine is identical with guanosin, to which Levene and Jacobs attribute the same formula.—Pharm. Journ. and Pharmacist, Dec. 10, 1910, 701 ; from Zschr. Physiol. Chem., *66* (1910), 128.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Glucosides—Biochemical Detection in Vegetable Drugs.—At the Tenth International Pharmaceutical Congress, at Brussels, Professor E. M. Bourquelot reviewed the results that up to the present time have been accomplished in the biochemical detection of glucosides in vegetable substances by means of emulsin. Preliminarily he reminds that the method is based on the differences existing between the optical and reducing properties of the glucosides and these properties of the hydrolytic products obtained by the action of the ferment. He cites a number of examples to illustrate the method and points out that since the introduction of this biochemical method, the number of glucosides capable of being split up by emulsin has been more than doubled. Moreover, the biochemical method has proven available for the detection of glucosides in plants from which it has hitherto been impossible to isolate or detect the presence of a glucoside. Thus, for example, an infusion of *Euphrasia officinalis*, L., which was formerly used in affections of the eye, gave with emulsin an optical rotation of 45′ and a reduction coefficient of 200, and *Gallium aparine*, L., which is used as a diuretic, showed a rotation of 1° 14′ and gave a reducing-coefficient of 230. The author regards it only a question of time when the actual isolation of the glucosides from these, as well as from an entire series of plants (Ranunculaceæ, Labiatæ, Oleaceæ, etc.) yielding analogous results, will be accomplished. As regards plants in which certain glucosides have been known and isolated, others have since been determined by the biochemical method. So, for example, *Aucubin*, in the leaves of *Plantago major*, *L.*, *P. media*, L., and *P. lancolada*, L., and *Arbutin*, in *Chlora perfoliata*, L., in *Gentiana Pneumonanthe*, and in *Pirola rotundifoliata*, L.—Pharm. Ztg., lv (1910), No. 84, 848.

Aloins—Constitution.—At the Tenth International Pharmaceutical Congress, in Brussels, Professor Léger reported the results of his studies on the constitution of the aloins. According to Liebermann's view, barbaloin and isobarbaloin are derivatives of anthracene, since he obtained by the action of fuming nitric acid on barbaloin chrysazinic acid, which he regards as the ester of anthracene. E. Schmidt obtained methylanthracene from aloin, although in very small quantities. More recently Tschirch and Oesterle have also investigated the constitution of aloin. The author has now endeavored to determine whether aloin is to be regarded as an oxidation product or the product of the hydrolysis of barbaloin. He finds that when nataloin is oxidized with sodium peroxide, methyl-iso-oxychrysazin is obtained, which is identical with the hydrolytic product obtained by Tschirch ; consequently barbaloin is not to be regarded as a derivative of anthracene, but of methylanthracene. Greenvolt has attributed to barbaloin the formula $C_{16}H_{16}O_7$, while Tilden gives the formula $C_{16}H_{18}O_7$. The author's investigations prove Greenvolt's formula to be the correct one. The methylnatalo-emodin obtained from nataloin with sodium peroxide, which is identical with the methyl-iso-oxychrysazin, may be split by the action of hydrochloric acid into natalo-emodin and methyl chloride. A polarimetric examination of aloin by the author proved the presence of a pentose in nataloin, which he has named aloinose, but which is identical with the d-arabinose of Fischer—thus demonstrating for the first time the occurrence in a natural product of vegetable origin of a product heretofore only obtained synthetically. Barbaloin therefore splits up into $C_5H_{10}O_5$ and $C_{15}H_{10}O_5$ on hydrolysis. Isobarbaloin yields the same aloemodin and the same arabinose as does barbaloin. The nataloin of Fischer yields on treatment with sodium peroxide a methyl product, which the author designates as "methoxy dioxy-methylanthraquinone."—Pharm. Ztg., lv (1910), No. 82, 828.

Aloins—Products of the Action of Nitric Acid.—E. Léger points out that picric and chrysamic acid, hitherto regarded as derivatives of aloins, are in reality secondary products of the action of nitric acid on the aloins. The immediate product of this reaction is tetranitrated aloemodin, which is capable of being changed into chrysamic acid. This last furnishes, in its turn, trinitro-2. 4. 6.' *m* oxybenzoic acid, transformable itself into carbon dioxide and picric acid, by the prolonged action of nitric acid. The formation of trinitro-*m*-oxybenzoic acid is interesting, since it has been the means of establishing the constitution of chrysamic acid, tetranitrated aloemodin, and, as a consequence, that of aloemodin. These facts throw a new light on the constitution of the aloins, which are, as the author has shown, glucosides decomposable into aloemodin and *d* arabinose. They also indicate that the molecule of *d*-arabinose replaces the hydrogen of the phenolic OH in position one of aloemodin to give

barbaloin, and replaces that of the phenolic hydroxyl in position 8 to give isobarbaloin. The alcoholic hydroxyl remains free, as happens in the case of salicin, which carries its glucose molecule, not on the alcoholic hydroxyl, but on the phenolic hydroxyl of saligenin. Salicin, under slight oxidation, is transformed, in fact, into helicin, a glucoside decomposable into glucose, and salicylic aldehyde.—Pharm. Journ. and Pharmacist, Oct. 21, 1912, 528; from Journ. de Pharm. et Chim., Sept. 16, 1911, 241.

Aloin—Characters and Tests.—G. Mossler gives the following characters and tests for aloin: When dried in a vacuum it melts at 150°, forming a brown transparent mass. Its solubility in cold water is 1 in 65, in hot water 1 in 4, in alcohol 1 in 11; it is almost insoluble in ether or chloroform. If 1 centigram is dissolved in 5 Cc. of water, 1 drop of copper sulphate solution and 2 or 3 drops of sodium chloride solution added and the mixture warmed, a red color is produced; too much copper sulphate spoils the test. A very dilute aqueous solution of aloin (except the aloin from Natal aloes) gives a greenish fluorescence on addition of a little borax solution; aqueous solutions of aloin also give a dark brown color with ferric chloride. The dry substance gives a carmine-red color with strong nitric acid, but the aloin from Cape aloes gives a green. If an aqueous solution of aloin is shaken with ether, and the ethereal layer separated and shaken with a little caustic potash, the latter becomes colored red, this reaction being due to the small quantity of oxymethylanthraquinone present in the aloin. One gramme of aloin should form a clear neutral solution in 5 Cc. of hot water, and it should leave no ash when ignited.—Pharm. Journ. and Pharmacist, Aug. 13, 1910; from Ztschr. d. allgem. Osterr. Apoth. Verein., 1910, 231.

Amygdalin—Phases of the Hydrolytic Action of Emulsin.—The experiments of L. Rosenthaler lead him to the definite conclusion that the hydrolysis of amygdalin by emulsin occurs in three distinct phases, depending in each case on the influence of a distinct enzyme: (1) *Amygdalin*, by the action of the amygdalan, splits up into mandel-nitril glucoside and *a*-glucose: (2) *mandel-nitril glucoside* is split by a β-glucosidase into *d*-benzaldehydcyanhydrin and β-glucose; (3) *d-benzaldehydcyanhydrin* is split by d-oxnitrilose into benzaldehyde and hydrocyanic acid.—Arch. d. Pharm., 248 (1910), No. 7, 534–535.

"True" Arbutin—Preparation from Commercial Arbutin and Properties.—According to the recent investigation of Hérissey, communicated to the Tenth International Pharmaceutical Congress in Brussels, "true" (genuine) arbutin is a glucoside, which by hydrolysis with the emulsin is split into glucose, $C_6H_{12}O_6$, and hydroquinone, $C_6H_4OH.OH$. Commercial arbutin is a mixture of "true" arbutin and of methyl arbutin—the latter yielding methyl quinone on hydrolysis. If this commercial arbutin is dissolved in alcohol, precipitated with solution of potassium hydroxide,

the precipitate dissolved in acetic acid, and then precipitated with potassium carbonate, the crystalline potassium salt of "true" arbutin is obtained, and from this the pure arbutin may be prepared. "True" arbutin crystallizes with one mol. of water of crystallization, and is identical with the glucoside which Bourguelot and Miss Fichtenholz have recently isolated from the leaves of the pear tree. It has two melting points, the one at 142–143°, the other at 194–198° C., and has the optical rotation of —63° 5′.—Pharm. Ztg., lv (1910), No. 82, 828.

Pyrus Glucosides—Occurrence in the Leaves of Different Species.—E. Bourguelot and A. Fichtenholz have investigated the glucosides occurring in the leaves of different species of *Pyrus*. From their investigations it appears that arbutin, previously found by them in the leaves of several varieties of *Pyrus communis*, to be confined exclusively to the leaves of the pear trees—neither the leaves of *Pyrus Cydonia*, *P. malus*, *P. aucuparia*, or *P. torminalis* giving any indications of its presence. In the leaves of *P. torminalis*, however, just as in those of *P. Cydonia*, discovered some time ago, a cyanogenetic glucoside was found as a constituent. The arbutin-content of the leaves of *Pyrus communis* differs according to the variety of the plant, although apparently independent of the period of vegetation. The blackening of the leaves in autumn is assumed by the authors to be attributable to the action of an oxydase on the glucoside, while the yellow coloration of the leaves of the varieties is attributed to the presence of methyl-arbutin along with arbutin.—Pharm. Ztg., lvi (1911), No. 13, 128; from Journ. de Pharm. et Chim., 1911, No. 1.

True Arbutin—Occurrence in the Leaves and Bark of Wild and Cultivated Pear Trees.—Further investigation of the fresh leaves of the wild pear by E. Bourguelot and A. Fichtenholz (see Pear and Quince Leaves) prove that they are very rich in arbutin, yielding 2.5 per cent. The glucoside is free from any methyl-arbutin. The leaves of the cultivated pear "Beurre magnifique" contain less, not more than 1 per cent. The same glucoside has also been found in the winter buds or shoots of this kind of pear. The winter bark of the shoots of the "Carisi" pear, free from leaf buds, contained arbutin and a small amount of another glucoside. In the bark of the same variety collected in June, when the tree was in full vegetation, only small quantities of arbutin were present, together with another glucoside, not yet isolated, which is hydrolysed by emulsin. The root bark of the wild pear was found to contain only a small amount of arbutin. As so many of the cultivated pears are grafted on quince stocks, the roots of these did not afford reliable material for examination. It is interesting to recall that although arbutin has been found in all the parts of the pear-tree examined, and in quantity in the leaves, the leaves of the apple tree contain none, nor any glucoside hydrolysable by emulsin. As long ago as 1835, however, de Koninck and Stass detected the pres-

ence of phloridzin in apple-tree root, and stem-bark and leaves, and the same glucoside has been stated to occur in the same organs of the pear. The connection between arbutin and phloridzin, is not very apparent; its presence in the pear, therefore, requires confirmation; the more so as the original papers, in which its presence is recorded, give no very precise details, and the glucoside does not appear to have been definitely characterised.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 625; from Journ. de Pharm. et Chim., 1911, *4*, 198.

Arbutin—Further Investigation Regarding its Presence in Pear Leaves.—Experiments made by E. Bourguelot and A. Fichtenholz with certain plants which have been separated from the genus *Pyrus* by some botanists, on morphological grounds, give chemical evidence supporting this separation. Thus, the leaves of *Cydonia vulgaris*, of *Malus* (*Pyrus*) *communis*, of *Sorbus* (*Pyrus*) *aucuparia*, and of *S.* (*Pyrus*) *torminalis*, are all found to be devoid of arbutin when tested by the biological method, although this glucoside is a constant constituent of the leaves of *Pyrus communis*. As has already been shown, quince, mountain ash, and service-tree leaves all contain cyanogenetic glucosides, and the last also gives indication of the presence of another glucoside, but not arbutin. Apple leaves give no indication of any cyanogenetic glucoside, nor of arbutin. It has further been noted that the leaves of some varieties of pears turn black when, or before, they fall, and others become yellow. It is now found that the black leaves are of those varieties of pears, like "Louise-bonne" and "Carisi," which contain, even at the time of falling, only arbutin, and no methyl arbutin. Those pears which have yellow leaves in autumn, such as "Beurré Diel" or "Beurré magnifique," contain both methyl arbutin and arbutin. When oxidised by the specific oxydase present arbutin gives a dark brown color, and methyl arbutin a yellow-orange tint. These reactions have been obtained, *in vitro*, by exposing solutions of these glucosides to the action of emulsin and gum-arabic solution or *Russula delica* juice to furnish the oxydase. It is, therefore, evident that the different autumnal tints observed in pear leaves are due to the action of oxydases on the glucosides contained in the leaves.—Pharm. Journ. and Pharmacist, Febr. 4, 1911, 133; from Journ. Pharm. et Chim., 1911, *3*, 5.

Arbutin—Detection in Plants by Microsublimation.—O. Tunmann finds that although arbutin cannot be sublimed for micro-examination without decomposition, the hydroquinone formed by its hydrolysis with dilute hydrochloric acid can be easily detected in that manner. The finely disintegrated material is treated in a micro cell with 2 or 3 drops of hydrochloric acid 1 : 10 and allowed to stand for a few minutes. The mixture is then warmed on an asbestos plate, a second slide, fixed 3 Mm. above the material, being used to condense the sublimate. In the presence of arbutin very characteristic crystals of hydroquinone will be obtained. The author

has been able easily to demonstrate the presence of arbutin in *Arctostaphylos uva-ursi*, *Vaccinium myrtillus*, *Kalmia angustifolia*, and *Pyrola rotundifolia* in this way.—Pharm. Journ. and Pharmacist, Sept. 16, 1911, 383; from Ber. d. D. Pharm. Ges., *21* (1911), 312.

Aucubin—Presence in Several Species of Garrya.—Hérissey and Lebas state that in addition to the original source, the genus *Aucuba*, and several members of the genus *Plantago*, several species of the family *Garrya* are now found to contain aucubin; the species giving this glucoside are *Garrya elliptica*, *G. macrophylla*, and *G. thureti*. In all cases the leaves and young twigs were the material employed in the experiments. Seeds could not be obtained; probably, as in the case of *Aucuba*, the isolation of aucubin from them would be simpler. In view of the wide distribution of aucubin, and the relatively large amount in which it occurs, especially in the seeds, it is probable that the glucoside plays an important part in the vital processes of plant development.—Pharm. Journ. and Pharmacist, Jan. 14, 1911, 37; from Journ. de Pharm. et Chim., 1910, *5*, 490.

Balanopherin—Source and Properties.—M. Simon contributes the results of his studies of balanopherin, a constituent of plants belonging to the *Balanophoræ*. By extraction with ether he obtained a grey-brown mass, which on recrystallization yielded a pure white indistinctly crystalline body melting at 56°-57°, and proving on combustion to have a formula corresponding to that previously assigned to this body by Poleck—namely $C_{12}H_{20}O_2$. By distillation in vacuo, as also by melting with KOH, balanopherin yielded a white, crystalline acid, which proved to be identical with palmitic acid.—Pharm. Ztg., lvi (1911), No. 28, 283; from Monatsh. f. Chem., xxxii (1911), No. 2.

Cantharidin—Quantitative Determination in Cantharides and the Tincture.—The "Hagen-Buchholz prize" of 1909–10; for the best essay on the subject of "A comparative examination of the methods which have been proposed for the estimation of free and combined cantharidin in cantharides and tincture of cantharides," has been awarded by the German Apothecaries Society to three papers, contributed by A. Kneip, N. Ney and F. Reimers, respectively, a symposium of which is published in the Archiv der Pharmazie. From this it appears that by experimentation with the various published processes, as well by processes of their own these three authors have reached results which differ very decidedly from each other. Ney recommends the method of Panchaud as modified by Siegfried, with some modifications of his own, and Reimers recommends the method of the Pharm. Germ. as modified by Fromme. Both of these methods depend on the use of chloroform for the extraction of the cantharidin after certain preliminary treatment with acids—the one sulphuric, the other hydrochloric acid. Kneip, on the other hand, recommends a method of his own, in which, after acidification of the powdered canthari-

des with alcoholic hydrochloric acid (25 per cent. HCl), they are extracted with a mixture of 30 parts of petroleum ether and 50 parts of benzol. Both Kneip and Reimers also determined the water-content in the drug and the ash (found by Kneip to be 7.45–11.58 per cent. and 5.54–6.99 per cent., respectively), and Reimers also determined the percentage of fat in the sample. The results obtained by the three authors are exhibited in the following:

Cantharides.	Ney.	Reimers. (3 samples).	Kneip.
Total Cantharidin	0.885 %	0.878 %, 0.889 %, 0.809 %	0.918 %
Free Cantharidin.....	0.580 %	.....	0.730 %
Combined Cantharidin	0.305 %	.....	0.188 %

For the details of these highly interesting papers (and the various processes experimented with) the original "symposium" must be consulted in Arch. d. Pharm., *249* (1911), No. 4, 259–285.

Convallarin and Convallamarin—Differentiation.—C. Reichard has studied the chemical reaction of the glucosides convallarin ($C_{34}H_{62}O_{11}$) and convallamarin ($C_{23}H_{44}O_{12}$), which were prepared from the root and herb of *Convallaria majalis*, with the object of determining tests for their distinction. As the result of a long series of experiments he finds that these two glucosides may be readily distinguished from each other by their reaction with sulphuric and nitric acids, by hydrochloric, molybdic, tungstic, vanadic and titanic acids, by copper sulphate, mercurous nitrate, stannous chloride, and particularly by sodium iodate, which give a most characteristic reaction. If convallarin and convallamarin are treated with the same quantities of sodium iodate and water, a pure white residue is obtained from convallarin on drying the mixture spontaneously, while the residue remaining from convallamarin assumes a form resembling the edging of glass by hydrofluoric acid. The mass remains moist, but retains its transparency. On the addition of hydrochloric acid to the product from convallamarin, an intensely yellow color is at once developed, whereas in the case of convallarin the product remains colorless for a long time and is then only followed by a faint yellow coloration. The author attributes these differences in the behavior of the two glucosides to the inferior susceptibility of the convallarin to the reducing effect of the iodate upon it.—Pharm. Zentralb., lii (1911), No. 8, 183–188.

Gentiopicrin—Action of Emulsin in Presence of Alcohol.—E. Bourguelot and M. Bridel have previously observed that the natural emulsin present in gentian root hydrolizes gentiopicrin in alcohol, 60 per cent., as in the

case of the tincture of gentian of the French Pharmacopœia, and that almond emulsin acts in a similar manner. Experiments are now recorded which show that emulsin in powder form will hydrolize gentiopicrin even in 90 per cent. alcohol, and that by simple contact, for the ferment is quite insoluble in liquids which contain 60 per cent. or more of alcohol. In an alcoholic menstruum hydrolysis is arrested when a certain proportion of the glucoside has been decomposed, without the ferment having been destroyed, even after three months in contact with the alcohol. The amount of glucoside which has been hydrolized by the time this limit is reached, is less in the case of stronger spirit than of weaker. Emulsin only begins to be dissolved in alcohol of 50 per cent., a medium in which it exercises only a slow hydrolysis; with spirit of lower alcoholic strength the hydrolysis is more rapid directly as the alcoholic strength is less. It is probable that emulsin will act upon other glucosides as well as upon gentiopicrin in alcoholic media.—Pharm. Journ. and Pharmacist, Dec. 16, 1911, 813; from Journ. de Pharm. et Chim., 1911, *4*, 385.

COLORING MATTERS.

Bixin—Chemical Constitution.—A. Heiduschka and H. Riffart observe that, although bixin has long been known as a constituent of *Bixa orellana*, its constitution has not been established. The formula assigned by Zwick, $C_{27}H_{29}O_2(OH)_2OCH_3$, appears to be erroneous; only one hydroxyl group is present, and the di-potassium salt is only formed by the saponification of the methoxyl group. The empirical formulæ, $C_{29}H_{34}O_5$ and $C_{28}H_{34}O_5$, have both been given for bixin, and the latter appears to be the correct one. If bixin is brominated in glacial acetic acid solution, ten atoms of bromine are added, and the product contains 62.48 per cent. of bromine; but if the bromination is carried out in chloroform solution, the product contains 71.45 per cent. of bromine and appears to be a tetrahydromide of the decabrombixin, $C_{28}H_{38}O_5Br_{14}$, or $C_{28}H_{34}O_1Br_{10},4HBr$. Similarly, chlorination of bixin in chloroform solution gives a compound containing 51.92 per cent. of chlorine, corresponding to the formula $C_{28}H_{34}O_5Cl_{10},4HCl$. The iodine absorption value of bixin, determined with either Wijs's or Hübl's solution, agreed with the addition of ten atoms of iodine. Dry hydrochloric acid gas acting on bixin in chloroform solution gave the compound $C_{28}H_{31}O_5 11HCl$.—Arch. d. Pharm., *249* (1911), No. 1, 39.

Carthamine—Correct Chemical Formula and Reactions.—T. Kametaka and A. G. Perkins discard the formerly recognized formulas for carthamine in favor of $C_{25}H_{24}O_{12}$ as being most probably correct. When dried in the air it crystallizes with $2H_2O$, gives with dilute alcoholic potassium acetate the salt $C_{25}H_{23}O_{12}K$, in green, iridescent needles, and an amorphous benzoyl compound melting at 230–232° C. Boiled with alcoholic aniline it gives a substance $C_{25}H_{24}O_{12}$, C_6H_6N, in long, yellow needles, melting and

decomposing at 276–278° C., soluble in alkalies with a yellow color, and for which the name aniline xanthocarthaminate is proposed. With nitric acid it gives picric acid. Digested with boiling 50 per cent. potassium hydroxide, it yields *p*-coumaric acid and *p*-hydroxybenzaldehyde. Hydrogen dioxide in presence of sodium carbonate also produces *p*-coumaric acid, and in a similar way the crude methylation product of carthamine yields with hydrogen dioxide, *p*-methoxycinnamic acid, and probably *p*-methoxycinnamaldehyde, and with chromic acid, anisaldehyde and anisic acid.—Pharm. Journ. and Pharmacist, Aug. 30, 1910, 299; from Proc. Chem. Soc., *26* (1910), 181.

Ergoxantheïn—A New Active Principle Found in Ergot.—Prof. W. T. Wenzell, well known as an authority on the active constituents of ergot, announces the discovery of a new active principle found in fluid extract of ergot, not an alkaloid, but a principle possessing an undoubled action upon the human organism. The substance has been provisionally named "Ergoxantheïn" (ergot-yellow) on account of the color of its alcoholic and etherial solutions. After a brief historical summary of the discovery of the alkaloids of ergot, Professor Wenzell describes the method by which he obtained this new principle, to which he attributes the following physical and chemical properties:—An orange-yellow, uncrystallizable solid, soluble in alcohol and ether, but insoluble in water, in chloroform, and in tetrachloride of carbon; soluble also in benzene, acetic ether, amyl alcohol, acetone, and carbon disulphide. Ergoxantheïn seems to bear a close relationship to "lutein," a yellow resinous pigment distributed in the animal and vegetable kingdom, but differs materially in its behaviour towards chemical tests. The author also points out the differences by which it is distinguished from other ergot pigments (scleroxantheïn, fusco-sclerotinic acid, scleroerithrin, scleroiodin, etc.). Regarding the physiological action of this new ergot pigment, experiments were made for determining the blood pressure by Gaertners' Tonometre, Dr. A. W. Perry, of San Francisco, officiating, on the author's own person, a dose of the substance, corresponding to 1 fluidrachm of the fluidextract being administered. After 10 minutes the pulse dropped from 80 to 75 beats per minute, and the blood-pressure, which stood initially at 133 Mm., had now risen to 168 Mm., but dropped from this time on to its initial within half an hour. The effects as experienced by the author during the experiments are described by him: as "a sense of fullness in the head, face flushed, considerable mental exhilaration."—Amer. Journ. Pharm., Sept., 1910, 410–416.

Biliary Coloring Matter—Detection in Blood.—Fr. Obermayer and H. Popper recommend the following three methods as being well adapted for the detection of biliary coloring matter in blood:

(1). A stratum of reagent, prepared in the proportions of 625 Cc., of

water, 125 Cc. of 95 per cent. alcohol, 70.0 Gm. of sodium chloride, 12.0 Gm. of potassium iodide, and 3.5 Cc. of 10 per cent. tincture of iodine, is poured into a test-tube and stratified with 5 Cc. of the blood serum. In the presence of biliary coloring matter a green ring develops in a few seconds at the contact zone, the intensity of which is proportional to the amount of the pigment in the blood.

(2). The blood serum is precipitated with twice its quantity of 95 per cent. alcohol, filtered and the filtrate is stratified on a layer of alcohol solution of iodine or of ferric chloride. A green, blue or blue-violet ring develops at the zone of contact. This reaction is available for the quantitative estimation of the pigment by diluting the alcoholic filtrate until the development of a blue ring fails.

(3). The alcoholic filtrate obtained from about 5 Cc. of blood serum as described under (2) is heated to boiling after the addition of 5 drops of 20 per cent. of hydrochloric acid. The originally yellow color of the filtrate changes to green or blue-green, depending on the quantity of bile-pigment present. By the aid of these three reactions the authors have determined that biliary coloring matter is present both in normal blood serum and urine.—Pharm. Ztg., lvi (1911), No. 21, 210; from Wien. Med. Wschr. lx (1910), 2592.

Urobilin—Detection in Urine.—M. C. Carrez proposes the following new method for the detection of urobilin in urine;—45 Cc. of urine are shaken with 30 Cc. of an acid solution of mercuric sulphate (prepared as recommended by Denigés) and filtered; then 1.0 Gm. of talc is added to 50 Cc. of the filtrate, the mixture is well shaken, and immediately filtered. The residual talc, which has absorbed the urobilin, is washed with water, and then treated on the filter with Oliviéro's reagent (zinc chloride, 10.0; aq. ammon., 9.0, to dissolve; 90 per cent. alcohol, 80.0; acetic ether, 20.0). In presence of urobilin a handsome green-fluorescent filtrate is obtained. Instead of using Oliviéro's reagent, the talc residue on the filter may be treated with 10 Cc. of alcohol acidulated with hydrochloric acid, the filtrate collected in a separatory funnel, diluted with 100-150 Cc. of water. and shaken with 5 Cc. of chloroform. If then an alcoholic solution of zinc acetate (1:1000) is added drop by drop to the separated chloroform, this also assumes a fine green fluorescence if urobilin is present in the urine under examination.—Pharm. Ztg., lvi (1911), No. 37, 374; from Rép. de Pharm. 1911, No. 4.

Luciferesceine—A Fluorescent Substance from Luminous Insects.—In 1909, Coblentz showed that the firefly, *Photinus pyralis*, contains a substance which affords bright blue, fluorescent solutions with alcohol. F. A. McDermott mentions that the same substance has since been found in other fireflies, all of which have a strong peculiar odor and emit a sticky, milky fluid, containing a large amount of the fluorescent principle.

Dubois found a fluorescent substance in the large Cuban elaterid firefly, the cucuyo, *Pyrophorous noctiluca*, which he considered to be æsculin. This may not be identical with the fluorescent matter of *Photinus*, but it is nevertheless remarkable that two such widely different luminous insects should both give a fluorescent secretion. There is no evidence to show, as yet, that the fluorescent substance has any connection with the luminosity of the insect. They occur, moreover, in many lower organisms which are not luminescent. The author has isolated the fluorescent substance from various species of *Photinus*, and names it luciferesceine. It appears to possess slightly basic properties. It is a yellowish, amorphous substance, soluble in alcohol, and amyl alcohol, less soluble in ether, insoluble in chloroform, carbon tetrachloride, and benzol. Stable at ordinary temperatures below 100° C. it melts and boils above that temperature, giving off an unpleasant fishy odor. When injected into animals it appears to have a toxic action, but this might be due to a trace of cantharidin derived from the beetles and accompanying the luciferesceine.—Pharm. Journ. and Pharmacist, May 8, 1911, 587; from Journ. Amer. Chem. Soc., *33* (1911), 410.

Quercitrin—Formula.—According to C. W. Moore, the generally accepted formula for quercitrin is incorrect, and experiments made by him confirm that assigned to it by Brauns, namely, $C_{21}H_{20}O_{11}.2H_2O$. The melting point of the air-dried glucoside is now given as 183–185° C., and that of the anhydrous substance, 250–252° C. The specific rotary power is $[a]_D$—140.9°. When excess of sodium ethoxide is added to an alcoholic solution of quercitrin, a trisodium derivative is precipitated; it is a dark yellow powder, sparingly soluble in cold alcohol.—Pharm. Journ. and Pharmacist, July 23, 1910, 97; from Proc. Chem. Soc., *26* (1910), 182.

Thuyorhodin—A New Coloring Matter from Coniferous Leaves.—It is well known that the foliage of some coniferous trees, and particularly that of the thujas, changes color in winter, the portion exposed to sunlight becoming brown, or red. This has been attributed to a modification of the chlorophyll pigment, and the formation of brown chlorophyllane. This, according to Tsvett, however, is not the case; the change of color of the leaves is due to the formation of a red coloring substance not previously isolated, thuyorhodin. It gives red solutions with carbon disulphide, pink with alcohol, and yellow with petroleum ether. The last-named solution parts with the greater part of the coloring matter when shaken out with 80 per cent. alcohol. Thuyorhodin is colored indigo-blue by sulphuric acid, and is unaffected by caustic alkalies. It has been isolated from the reddened leaves of *Thuja orientalis*, *Cryptomeria japonica*, and from the green leaves of *Cupressus naitnocki*, *Retinospora plumosa*, *Juniperus virginiaca*, and *Taxus baccata*.—Pharm. Journ. and Pharmacist, May 20, 1911, 672; from Compt. rend., *152* (1911), 788.

Tar Colors—Classification on the Basis of Toxicity and Innocuousness. A. Beythien and H. Hempel publish an interesting and useful paper in which they classify and distinguish the notoriously toxic and suspicious tar colors from those that are considered innocuous and therefore suitable for coloring food products. Dividing these coloring substances into two groups, they enumerate the innocuous tar colors, which may unhesitatingly be used for food-coloring, by their trade names, as follows: Alizarin-blue; amaranth; bordeaux-red; brilliant-blue; diamond-fuchsin; genuine-blue; genuine yellow R; genuine red; eosin; erythrosin; fuchsin S; light-green S. F.; yellowish; indigodisu'fonic acid; induline; light-blue; malachite-green; methyl-violet; naphthol yellow S; orange I; orange II; paris-violet; phloxin; ponceau 3 R; ponceau red; primrose; roccelin; roscellin; rubin; acid-yellow S; acid-fuchsin; solid blue; tropaeolin ooo, and water-blue. The authors emphatically urge the legal adoption of a list of tar colors that may be employed by manufacturers of food products. —Pharm. Ztg., lvi (1910), No. 53, 537; from Chem. Ztg., 1910, No. 14.

Methylene Blue—Use as Indicator in Iodometric Titrations.—F. S. Sinnott states that when a solution of iodine in potassium iodide is mixed with a solution of methylene blue an iodo compound of the coloring matter is precipitated. In dilute solutions the progress of this reaction is indicated by a change from blue to yellowish-green, and, finally, a clear yellowish brown color is developed, the change being very distinct. A solution of methylene blue, containing approximately 0.05 Gm. per litre, was found by the author to possess a convenient depth of color to serve as an indicator. About 1 Cc. was used for 50 Cc. of liquid in titrations. As an example of the delicacy of the color change, 10 Cc. of the methylene blue solution required 0.15 to 0.25 Cc. of $\frac{N}{100}$ iodine solution to cause the first change of color. The iodine required to combine with the methylene blue present in 1 Cc. of the solution is equivalent to 0.2 Cc. of $\frac{N}{1000}$ iodine solution. The solution of methylene blue may be used instead of starch solution in iodometric titrations, and results indicate that it has advantages over the most carefully prepared starch solutions. In the estimation of copper and of sodium sulphide, the presence of a precipitate somewhat masks the end reaction.—Pharm. Journ. and Pharmacist, Aug. 6, 1910, 215; from Analyst, July, 1910, 309.

Methylene Blue—Its Detection in Urine—is the subject of a paper by Otto Raubenheimer, in "Proceedings," 1910, 992–994.

ALBUMINOIDS.

(*Including Animal Products.*)

Albumen—Microchemical Method of Determination.—Reviewing the various methods for the recognition of albumen, Th. Bohorny mentions

that Millon's reagent and the biuret reaction are chiefly relied on for this purpose. With regard to sensitiveness, the biuret reaction leaves nothing to be desired; for, according to Neumeister, it is quite possible to determine peptone in dilutions of 1 : 100,000, although according to Kühne the biuret reaction is less sensitive for albumoses, while the genuine (native) albumens are said to give no biuret reaction at all. As is well known, potassium ferrocyanide is also used for the determination of albumen; but this reaction, as well as that with phosphomolybdic acid, tannic acid, potassium-mercuric iodide, picric acid, etc., is applicable also to the estimation of the organic bases. The author now finds, however, that coagulation, which can be produced in various ways, is the most useful for the microchemical determination of albumens, the process of coagulation being characteristic for the genuine albumens and incomparable with any other. By coagulation also it becomes possible to prove the albuminoid nature of the proteosomes which has heretofore been attended with some difficulty. —Pharm. Ztg., lvi (1911), No. 12, 116; from Chem. Ztg., 1911, No. 8.

Dry Egg Albumen—Use to Replace Fresh Egg Albumen in Pepsin Assays.—Albert Zimmerman says that the rapidity of the action of pepsin upon the album coagulated in the egg is much influenced by the age of the egg; a fixed weight of pepsin does not always dissolve a fixed weight of this albumen. The albumen from eggs that are from one to five days old is not digested so rapidly as that obtained from eggs which are from five to ten days old. When above ten days old the albumen is again less rapidly digested, so that an egg 21 days old gives nearly the same result as an egg one day old. Using the U. S. P. test, the residue left after the digestion, measured, for eggs one day old, 1½ to 3½ Cc., which was gradually reduced to 0.4 to 0.6 Cc. for eggs between six and ten days old, and after this again gradually increased to 2½ to 3½ Cc. residue for eggs 21 days old. These observations led to the search for a more reliable standard, which was found in dried egg albumen. It was not found possible, however, by simple methods to get the dried egg albumen into the same firm coagulated consistence as is formed in the egg, which difference is very likely due to the latter being confined in the shell, where the albumen is more or less under pressure during the coagulation. The solution of dried-egg albumen, when coagulated by heat, yields a very finely subdivided coagulum, which is not influenced very much by greater or less concentration. The extreme subdivision of this albumen makes the end reaction different than that now in use in the U. S. P. pepsin assay, and as the coagulum from this dried albumen is not coarse and dense, like the sifted albumen from the egg, it does not settle so rapidly to the bottom of the tube. If any undissolved albumen is present, it remains suspended throughout the tube, making the contents appear cloudy. The best end reaction to apply for the dried egg albumen is complete solution of the al-

bumen. The author gives the details of the method of applying the new standard, which gives more accurate results than the present official method, but has the one disadvantage in requiring standardization before it can be used.—Pharm. Era, Oct., 1911, 432; Proc. Amer. Chem. Soc., Div. of Pharm. Chem., Aug., 1911.

Referring to the above paper, M. R. Schmidt observes that the rationale of the method proposed by Mr. Zimmerman is unassailable. Practically, it is to be highly recommended if all its provisions can be carried out. But if on any point an indefinite term is introduced, the assay of pepsin by such a method becomes as questionable as the present official method. There is strong reason to believe that an uncertainty does exist in all methods which are based on the use of coagulated fresh albumen. This objection will apply not only to the U. S. P. assay process, but to Mr. Zimmerman's modification, and to the processes of foreign pharmacopœias. The unknown factor is *the unknown percentage of water in the coagulated albumen.*

Egg albumen belongs, and always will belong, to the class of indefinite standards, and this fact must be borne in mind in reporting assay results. Otherwise endless confusion is sure to ensue between manufacturers and buyers. The U. S. P. should prescribe limits between which a sample of pepsin shall be considered as of official strength. In order to fix these limits, the variable character of egg albumen, and the effect of the age of the egg on the duration of peptic digestion, must be carefully studied. There is opportunity for much valuable work in connection with this problem.—Ibid., p. 433.

Pepsin—Method of Valuation proposed for International Adoption.—E. Hercod and T. Maben, in a paper contributed to the 10th International Pharmaceutical Congress propose the following process for the valuation of pepsin: The coagulated albumen, obtained by boiling an egg ten minutes in water, is passed through a sieve of 15 meshes to the square centimeter, and pressed between two sheets of filter paper. 10 Gm. of the albumen so prepared is placed into a vessel of 200 Cc. capacity, containing 100 Cc. of distilled water, heated to 50°, 0.25 Cc. pure HCl, and 5 Cc. of a 1 per cent. pepsin solution. The vessel is then placed on a water-bath heated to 52° and digested at this temperature for two hours, stirring the liquid every quarter of an hour with a glass rod. The albumen should now be dissolved and an opalescent solution formed.—Pharm. Ztg., lv (1910), No. 76, 768.

Lecithin—Conditions Concerning its Determination.—The results of a comprehensive study of the conditions concerning the determination of lecithin led Dr. R. Cohn to the conclusion that ether alone will not completely extract this body from products containing egg-yolk, lecithin preparations, etc. This is attributable to the fact that the colloidal lecithin is

absorbed and held with extreme tenacity by colloidal albumen. On the other hand, complete extraction of lecithin is possible by means of cold alcohol, treatment with hot alcohol being unnecessary, except in the case of insignificant quantities of lecithin which are probably retained by the phosphatides in the egg-yo k, and which are only soluble in hot alcohol. The determination of lecithin by extraction with ether and alcohol yields as a rule only reliable values if the products containing it have not been exposed to high temperatures. Errors may also be due to the addition of phosphoric acid or glycerophosphoric acid. In such cases it is necessary to extract the alcoholic extract with chloroform, and then to determine the lecithin content in the chloroform extract.—Pharm. Ztg., lvi (1911), No. 54, 545; from Ztschr. f. öff. Chem., 1911, No. 12.

Pepsin and Pepsin Preparations are systematically discussed by C. F. Nixon in "Proceedings," 1910, 1264–1266.

Pepsin.—Is the U. S. P. standard satisfactory to the practical pharmacist? is a question discussed in a paper by Franklin M. Apple, which appears in "Proceedings," 1910, 1125–1128.

Ferments—Action of Artificial Membranes.—A. E. Porter finds that a number of ferments, including pepsin, trypsin, and rennet, are rendered inactive by being kept in contact with artificial membranes, especially with collodion ones. Most ferments which have thus been inactivated have at the same time acquired inhibitive properties. The inactivation of ferments by membranes is not due to simple absorption, for there is no evidence of saturation of the membrane; on the contrary, its inactivating power appears to improve with repeated use. Although the inhibitive power of the inactivated ferments may be due in part to substances preformed in the solution, inhibition is still present after removal of these substances, suggesting that the ferment itself is changed by contact with a membrane into a substance having an inhibiting power on itself.—Pharm. Journ. and Pharmacist, March 25, 1911, 399; from Quart. Journ. Exper. Physiol., III, No. 4, December, 1910, 375, through Nature, March. 9, 1911, 54.

Enzymes—Actions due to their Influence, with Particular Reference to Pepsin.—In a paper read before the 1911 meeting of the Maryland Pharmaceutical Association, Mr. James E. Hancock interestingly expresses some thoughts on the action of enzymes. He says that ever since the discovery of enzymes, physiological chemists have tried to explain the transformations which occur under their influences and to systematically reason why these changes should be. One theory and another have been suggested, each of which has been based upon certain peculiarity of reaction that has happened under the particular investigator's notice. The study is fascinating because metabolism generally is a physiological process

that cannot be even approximately understood. Some authorities consider enzyme actions as a part of the vital processes themselves, but others evidently cannot see beyond the material reactions that occur, until even in these days of advanced science no acceptable agreement is settled upon. The subject is necessarily a theoretical, indeed an obscure inquiry.

In recent years a dynamic conception of their powers seems to be more and more to approximate a reasonable theory for these processes. Naegli assumes that catalysis is induced by vibratory action. It is supposed that the catalysing agent—the enzyme—coming in contact with a body favorable to its action, communicates the vibration of its atoms to the atoms of the molecules of the body that is being digested and breaks down their staple tension with a natural reduction of its complexus into other and simpler components. The dynamic law of Laplace and Bertholet that "an atom or molecule put in motion by any power whatever may communicate its own motion to another atom or molecule in contact with it," would thus seem to acquire a special significance in the bio-chemistry of the enzymes, and might account for the many catalyses and syntheses that occur in our own bodies and in growing plants and animals under the action of enzymes when influenced by the sun's rays and other favorable conditions. Ostwald's generalization practically implies the same character of action when he states that these changes are brought about by the increased activity of the molecular movement.

Accepting either or both these theories, even with modifications, they at least reconcile the transformations that may occur in the phenomena of digestion as a peculiar quality of the enzymes, the smallest particles of which may be assumed as being in a state of motion. During the past winter the author's attention was called to an antidigestion of *Pepsin* that could only be reconciled by this reasoning. As we all know, pepsin is a soluble, unorganized ferment that differs in its mode of action from living ferments, such as yeast and bacteria, in that it possesses no power of self-nutrition and multiplicatiou. Like all of the other animal extracts, it is surrounded by the limitations that nature has placed upon it. It will bear exposure to a prolonged low temperature without being injured and it is active only in weak acid solutions and then when accompanied by two conditions: the presence of water and heat. Nature's economy provides that it shall be physiologically active at and about 100° F., while an exposure of its simple solution to a temperature of 130° F. will quickly destroy its proteolytic power. Moreover, its digestive activity is always dependent on the medium in which it is exhibited. The U. S. P. requires that one grain of pepsin shall be able to digest 3000 Grs. of coagulated egg albumen when suspended in a 0.2 per cent. HCl solution with water. By repurification this standard may be increased to a much higher potency, but even in the highest degree of purification that has yet been obtained it is at least in combination with nucleo-proteid bodies. These nucleo-

proteids are combinations of nucleic acid with albumen. The author has carried out a series of experiments in which pepsin and its natural associates were the only possible albuminous quantity present, in an acidulated solution under the action of heat and electric light for ten days, and obtained the following results: A precipitation of modified nuclein that is insoluble in the acid medium and a propeptone moiety that remained dissolved in the solution. Unfortunately he is not prepared at this time to give the ultimate results, since certain conditions will not permit. Moreover, the principal purpose of this paper is to show that pepsin solutions should be kept in a cool, dark place, because of their sensitiveness to heat and light.—Proc. Md. Pharm. Assoc., 1911, 66–69.

Di-Iodo-Tyrosine — Suggested Use in Medicine.—A. Berthelot states that, on account of its close affinity to the natural iodo-albuminoids, 3.5-di-iodo-*l*-tyrosine is extremely well tolerated by man and animals. It is considered probable that by its administration, useful effects will follow with much smaller doses of iodine than are now considered to be necessary. On the other hand, amounts of iodine may be introduced, in this form, into the organism, greatly exceeding those at present used, and this without producing any harmful effects. The only drawback, at present, is the high price of tyrosine. But since tyrosine is a by-product of the manufacture of pancreatic peptones, this might be a cheaper source of the material or it might be produced synthetically.—Pharm. Journ. and Pharmacist, July 29, 1911, 137; from Compt. rend, *152* (1911), 1323.

Glue—Delicate Test.—E. Schmidt finds that if solution of ammonium molybdate is added to a solution of glue, and followed by a little dilute nitric acid, a white precipitate is formed which is amorphous and heavy, quickly falling to the bottom, and leaving a clear liquid. Gum arabic, linseed mucilage and egg albumen do not give such a precipitate, but only a slight turbidity even when strong solutions are employed. If 1 milligramme of glue is present in 5 Cc. of the liquid tested, a considerable precipitate falls at once; if only half this proportion is present, a precipitate will be found to have formed after about an hour; and if only 0.00001 Gm. of glue is present in 2½ Cc. of liquid, a distinct turbidity is still formed. This reaction may also be used quantitatively; the reagent is made by dissolving 3 Gms. ammonium molybdate in 250 Cc. of water, and adding 25 Cc. of dilute nitric acid of specific gravity 1.2; sufficient of this is added to the glue solution, the precipitate is washed with water acidified with nitric acid, at first by decantation and then on the filter, until nothing further is removed, then dried on the previously tared filter and weighed. The specimens of results given show that the figure obtained is usually about 5 per cent. too high.—Pharm. Journ. and Pharmacist, Oct. 22, 1910, 492; from Chem. Ztg., Aug. 9, 1910, 839.

Iodgelatin and Bromgelatin—Preparation for Internal Use.—R. Lomi

describes the following methods for preparing iodgelatin and bromgelatin; suitable for internal use:

Iodgelatin is obtained by heating for two hours in an autoclave, at two atmospheres, the following:—Gelatin, 50 Gms.; glycerin, 400 Gms.; water, 850 Gms.; iodine, 10 Gms.; potassium iodide, 20 Gms. The gelatin is dissolved in part of the water, and the iodine and iodide in another part, and the mixture completed. There is thus obtained a perfectly colorless liquid, which is well borne.

Bromgelatin is prepared by dissolving gelatin, 50 Gms., in a mixture of glycerin, 100 Gms., and water, 850 Gms., and adding to the cooled mixture, with shaking, bromine, 20 Gms. The mixture, kept, for one hour in an autoclave at two atmospheres, results in the production of a pale yellow liquid, which can be used as a medicament. The products, by dilution, or by evaporation at a gentle heat, can be brought to any desired percentage. For internal use the preparations should contain 2 per cent. of halogen.—Pharm. Journ. and Pharmacist, Jan. 28, 1911, 97; from Boll. Chim. Farm., 1910, *71*.

Extracts of Animal Organs—Preparation.—A long series of experiments on the catalytic action of liver powder and extracts for use in opotherapeutics confirm the results of previous work by E. Choay. He finds that only the extract prepared *in vacuo*, in the cold, retains unimpaired the oxidizing activity of the original liver pulp from which it has been prepared. It may sometimes be slightly more active than this, since even when preserved with every precaution in the ice chamber the original pulp may undergo deterioration. Pulp preserved at 42° C. shows marked autolytic change. When an extract is prepared in the air at 50° C., under most favorable conditions, such as could not be obtained on the manufacturing scale, the result compares unfavorably with a similar product prepared in the cold, *in vacuo*, and also with an extract obtained by evaporation at 50° C., *in vacuo*. The results show that the method of drying animal organs in the air at about 40° C. cannot fail to give defective preparations. The pancreatic and hepatic diastases are profoundly affected, and the catalytic action of liver tissue is much lessened. Probably the same occurs with the active agents with other animal tissues, so that the method of drying in the cold and *in vacuo* is the only one available for the preparation of organic extracts and ferments of full activity. In order to test the activity of powdered liver tissue, 0.25 Gm. is macerated for fifteen minutes in 80 Cc. of water; on then adding 20 Cc. of hydrogen peroxide (12 volumes) an immediate and abundant evolution of gas should take place. If no such reaction occurs the powder has probably been dried with heat. — Pharm. Journ. and Pharmacist, May 20, 1911, 671; from Journ. de Pharm. et Chim., 1911, *3*, 233 and 287.

Thyroideum Siccum—Suggested Standard.—Reginald R. Bennett, in view of the wide-spread belief among clinicians that the commercial thyroid preparations vary considerably in their degree of physiological activity, and the absence at present of an officially recognized standardization process, has made a series of experiments with the object of suggesting an adequate method of standardization. In the B. P. a process is described for the preparation of thyroideum siccum from the fresh glands of the sheep, but there are no details of any test which the pharmacist can apply in order to assure himself of the genuineness and activity of a powder which he has not prepared in his own laboratory. The agreement among the majority of pharmacologists that the activity of thyroid is directly proportional and dependent upon the combined iodine present, appears to render it desirable that an iodine standard should be fixed, especially in consideration of the wide variations of the iodine content, which, in samples obtained from leading manufacturers was found to vary in amount from 0.315 per cent. to 0.038 per cent. The author's experiments lead him to suggest an iodine standard of 0.15 per cent. as being adequate, without in any way unduly harassing the manufacturer, and to describe in detail a process of standardization which he has employed with satisfaction in this investigation.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1911, 410–413.

Thyroid Extract—Preparation for Therapeutic Purposes.—During the last decade there has been a marked increase in the interest shown toward the physiology of the internal secretions, and the therapeutic value of organic extracts has been the subject of much debate. Dr. S. P. Beebe, discussing the subject, points out that the thyroid gland has been the center of much of this debate, and that its usefulness as a therapeutic agent in other conditions than those of the classical myxœdema has been demonstrated so thoroughly that the demand for a standard preparation may no longer be ignored. This is the object of the author's present paper, in which, after drawing attention to the present-time supply of a variety of thyroid products prepared by different methods and undoubtedly of differing therapeutic effects, under a confusing terminology of products the precise nature of which is generally not known, he discusses in particular the question: "Does thyroid proteid free from iodine have any functional activity?" Summing up, he says that since the discovery of "iodothyrine" (by Baumann, 1896), it has been generally considered that this substance is the *sole* physiologically active principle of the thyroid gland; but in the author's opinion this conclusion is not justified by the facts. For reasons explained, there is no other substance that acts so economically and efficiently in the treatment of the various metabolic disorders associated with hypo function of the thyroid as the proteid precipitated from extracts of normal human thyroid glands by acetic acid and heat to 44° C.,

and for these reasons we should use only the proteid obtained by a similar method from animal glands. Accordingly the original precipitate is washed repeatedly with normal saline by decantation or centrifugation until the wash-water is free from biuret reacting substances. It is then dissolved by the addition of a little sodium hydroxide, the solution filtered through a thick paper mat and again precipitated with acetic acid. Heat is rarely required for this second precipitation. This washing process is repeated, the final washed precipitate being centrifuged or filtered out and dried out at a low temperature; or it may be kept in solution and after filtration through a Berkenfield kept for hypodermic use.

Proteids have been prepared in this manner from glands of pigs, beeves, sheep, and the human gland, and show quite a variation in the iodine content, as do the fresh glands—the variation in which is shown in a table. The average iodine content of 1 Gm. of the purified proteid from the normal human gland, determined after the method devised by Dr. Riggs, was *3.384* milligrams. This figure is, regardless of whether the proteid is richer or poorer in iodine, proposed as the standard, which is adjusted for the purpose of therapeutic application by dilution with the proper amount of lactose and made into two-grain tablets by the usual method, or into tablets of different strengths. With these at command, every therapeutic need is satisfied.—Amer. Journ. Pharm. February, 1911, 56–67.

Suprarenal Gland—Colorimetric and Physiological Estimation of the Active Principle.—Worth Hale and Atherton Seidell record the results of comparative studies with the main object of determining the relative values of the colorimetric methods proposed for the estimation of the active constituent of the suprarenal gland and of the physiological methods in use. Their experiments with the various color tests indicated that the potassium permanganate, the potassium ferricyanide with dilute ammonia, the sodium hydroxide, and potassium permanganate with lactic acid, reagents, gave little promise; but that the iodine method of Abelous, Soule and Toujan, the mercuric chloride test of Comessati, and the iodic acid reaction of Krauss (independently described by Fränkel and Allers), were found to be much more delicate. In the quantitative physiological assay of epinephrine a number of different methods have been proposed, all being based on some physiological action of the base. Of these the one most commonly employed is that of determining the relative rise in blood pressure as compared with a given amount of the pure base, and the results by this method served in the present investigation for comparison with those obtained by the colorimetric method of Krauss, and of Fränkel and Allers, depending on the use of iodic acid. The results are exhibited in a number of tables and point out that, while the figures obtained by the physiological method are some 30 per cent. higher in most cases than those obtained by the colorimetric method, the examination of

different samples of suprarenal preparations showed a close parallelism between the two sets of values. The most plausible explanation of the higher result by the physiological than the colorimetric method is apparently the obscuration of the pink tint by a yellowish extractive matter when the latter method is carried out. In conclusion, the present studies point out that very wide differences in activity are found in the various commercial samples of suprarenal preparations.—Amer. Journ. Pharm., Dec., 1911, 551–558.

Epinephrine Preparations—Desirability of a Standard.—A report of the Council on Pharmacy and Chemistry of the A. M. A., points out the desirability of having a standard for epinephrine preparations recognized by manufacturers, so as to insure uniformity of composition. The report outlines a method for assaying preparations of this type and suggests that the strength of epinephrine preparations be stated in terms of pure epinephrine and that the strength of the preparations should not vary more than 15 per cent. from the strength claimed, when tested according to the method outlined in the report in comparison with a known quantity of pure epinephrine.—Journ. Amer.. Med. Assoc., *57* (1911), 1149–1150.

Adrenine—Color Reactions.—A. J. Ewins contributes the results of an investigation into the more characteristic color reactions which from time to time have been suggested for the identification and estimation of adrenine and differentiation for allied bases. The following have been described: —(1) The production of a rose-red color on the addition of iodine (Vulpian). (2) The formation of a red color on addition of mercuric chloride (Comessatti). (3) The production of a reddish-violet color by the action or potassium bi-iodate and phosphoric acid (Fränkel and Allers), or by the action of iodic acid (Krauss). With solutions of the pure base, the delicacy of Vulpian's reaction is very great; a distinct reaction is obtainable with solutions of one of the hydrochloride (or other salt) of adrenine in 1,000,000. The color is apparently due to oxidation under the influence of iodine, the same color being produced by the action of other oxidizing agents, or when dilute neutral solutions of adrenine are allowed to stand exposed to light and air. The Comessatti reaction is considered by the author to be a particular instance of a general reaction. The following details are given to ensure the reaction being obtained with certainty:—To 1 Cc. of a dilute solution (1-100,000) of adrenine in distilled water is added an equal volume of a solution of sodium acetate (1 per cent.), followed by 4 or 5 drops (approx. 0.25 Cc.) of a solution of mercuric chloride in distilled water (1-1,000). If the solution now be warmed to 40°–50° a rose-red color is immediately obtained. At the laboratory temperature (15°) a pale rose tint is obtained after four or five minutes. The use of sodium acetate ensures uniform results. In the Fränkel-Aller's reaction it appears that free iodine plays an important

part, but it is modified to some extent by the conditions under which it is made. It is a very delicate reaction; a distinct reaction may be obtained with a solution of one of adrenine in one million. The reaction has been modified and intensified by G. Bayer, who adds sulphanilic acid to the solution as prepared by Fränkel and Allers; a yellow color instead of the normal rose tint is produced, and is seen in a solution of one of adrenine in five millions. Potassium persulphate, like the reaction referred to, oxidizes adrenine, giving a characteristic red color. It has advantages over those mentioned both in sensitiveness and in being readily obtained with crude extracts of the gland, etc. The characteristic color reactions of adrenine are given by other closely related bases, namely, by (a) the amino base corresponding to adrenine, (b) dihydroxyphenylethylamine and the corresponding methyl, ethyl and propylamino base, (c) aminoaceto pyrogallol. The bases of the type aminoaceto catechol do not give these reactions.—Pharm. Journ. and Pharmacist, Oct. 29, 1910, 517; from Journ. Physiolog., xl, No. 4, 1910.

Adrenine—Danger of Provoking Glycosuria.—The administration of 1 to 3 Mgm. of adrenine, either by injection or by the mouth, has by G. Ghedini and G. Mascerpa been observed to be followed by the appearance of sugar in the urine of 36 out of 102 cases so treated. The amount of glucose varied from 0.5 to 20 : 1000; a general relation seemed to exist between the amount of sugar present and the dose of adrenine. Glycosuria was more easily provoked with young patients. No influence was observed on the temperature. The smallest dose of adrenine provokes glycosuria with certainty in cases of diabetes, also in some nervous affections, influenza, and affections of the respiratory organs. Reaction is always negative in affections of the blood, erysipelas, malaria, nephritis, all nutritive disturbances.—Pharm. Journ. and Pharmacist, Nov. 11, 1911, 625; from Fol. Clin., 1911, *2* (3), through Nouv. Remédes, *28* (1911), 114.

Cobra Venom and its Anti-toxin—Action of Ultra-Violet Rays.—At the July (1911) meeting of the Société de Biologie de Paris a series of interesting communications was read on the influence of the ultra-violet rays from the mercury-quartz lamp. L. Massol showed that cobra venom is rapidly destroyed by exposure to these rays, while cobra anti-toxin serum is much more resistant. This is contrary to what occurs with heat or alcohol; with them the venom is more stable than the anti-toxin. A mixture of serum and venom is only partially destroyed by this treatment; the anti-toxin serum increases the stability of the venom. D. Danielopolu found that strophanthins, and notably Boehringer's preparation, and Gehe's crystalline strophanthin, had their activity markedly diminished by exposure to the rays for 30 to 120 minutes. T. Solacolu noted that saponin completely loses its hæmolizing power after such exposure.—Pharm. Journ.

and Pharmacist, Dec. 9, 1911, 779; from Journ. de Pharm. et Chim., 1911, *4*, 429.

Urine—Detection of Albumose.—U. M. Fittipaldi states that several years' experience have confirmed the advantages of his technic for detection of albumose in the urine. The presence of a considerable amount of albumen does not interfere with the findings. After precipitation with alcohol, the precipitate is dissolved in soda solution, 31 or 32 per cent. The solution is then tested with a 5 per cent. solution of nickel sulphate mixed with equal parts of ammonia. A few drops of this mixture are added to the alkaline solution, and the presence of products of proteolysis is shown by an orange-yellow tint. This test reveals the presence of albumosoids in a proportion of 4 to 10,000, or less. It is less sensitive than some of the other methods, but it is a reliable one.—Pharm. Journ. and Pharmacist, Aug. 12, 1911, 231; from. Gaz. degl. Osped. e del. Clin. (Milan), April 16, 1911.

Urine—Improvement of Helier's Test for Albumen.—In conducting Heller's test for albumen in urine, which consists of superimposing the urine on a stratum of nitric acid, the test is often vitiated by the admixture of the two strata. Attempts by F. Michel to obviate this fault in mixing, by raising the specific gravity of the nitric acid by means of salts dissolved in it, showed that the test was much improved by saturating the nitric acid (specific gravity 1.4) with ammonium nitrate. About 2 Cc. of the reagent is then taken, and 1 Cc. of the liquid to be tested is gently run onto its surface by means of a pipette; a well-defined white ring forms at once or after some time, according to the amount of albumen present. If carefully shaken, the two liquids only mix slowly, and if albumen is present the upper liquid becomes more or less cloudy, unlike what happens with ordinary nitric acid. If the mixture is heated it becomes clear, with the development of a slight yellow color; on cooling the turbidity reappears, and is much increased on diluting.—Pharm. Journ. and Pharmacist, April 22, 1911, 525; from Chem. Ztg., Feb. 16, 1911, 183.

Urine—Sugar a Normal Constituent.—In a paper by F. W. Parry and H. W. Bywaters on sugar in the healthy urine as a source of the osazone reaction, it is stated that one of the authors has for long contended that sugar is present in normal urine, and that the introduction of the phenylhydrazine test furnished the means of forcibly corroborating the conclusion. Although an osazone is always readily obtainable from the extracted sugar derived from a moderate quantity of urine, the preliminary separation, in many cases, is unnecessary; nevertheless it is an advantage to treat the urine in the first place with lead acetate to remove certain constituents which appear to prevent the osazone crystallizing. Twenty Cc. of the urine is shaken with 5 Cc. of 25 per cent. solution of neutral lead acetate, and filtered. Excess of lead is removed by adding 2 Gm. of powdered

sodium sulphate, boiling, cooling, and filtering; 15 Cc. of the filtrate is added to 2 Gm. of sodium acetate, 0.8 Gm. of phenylhydrazine hydrochloride, and 15 Cc. of acetic acid (B.P.) contained in a small flask, and the mixture boiled for fifteen minutes under a reflux condenser. The liquid is filtered while hot into a test-tube, and allowed to stand for some hours. The small deposit which collects will, in most cases, be found on microscopic examination to consist of the characteristic sheaves and rosettes of osazone crystals. The form of the crystals obtained is dependent on the varying conditions of concentration, cooling, presence of foreign matter, etc. Urines of low specific gravity may require to be concentrated, those of high gravity to be diluted, before the crystalline deposit is obtainable. Boiling for thirty minutes may sometimes be necessary. Besides normal human urines, the urines of horses, cats, and rabbits have been tested, and in almost all cases have been found to yield typical osazone crystals.—Pharm. Journ. and Pharmacist, Aug. 6, 1910, 215; from Brit. Med. Journ., July 9, 1910, 78.

Urine—Detection of Lactose.—A. Labat recommends the following method for the detection of lactose in urine: One hundred Cc. of the sample are made very faintly alkaline with ammonia and evaporated to about 10 Cc., filtered, and the filtrate clarified with Patein's reagent or with lead subacetate, and again filtered. This filtrate is then mixed with an equal volume of a solution composed of 1 Cc. phenylhydrazin, 3 Cc. glacial acetic acid and 20 Cc. acetate-acetic acid (= acetic acid and sodium acetate), the mixture heated on a boiling water-bath half an hour and allowed to cool. If now examined under the microscope the osazone produced is readily recognized. In most cases this consists of the glucosazone. but if lactose is present the formation of lactosazone manifests itself far more distinctly.—Pharm. Ztg., lv (1910), No. 92, 929; from Bull. trav. Soc. Pharm. Bordeaux, 1910, 342, through Chem.-Ztg., 1910, No. 126.

Urine—New Constituent, Urochromogen, and its Chemical Nature.—M. Weisz states that the yellow color of urine is due to the coloring matter, urochrome, which appears to be closely related to the proteic acids, substances containing nitrogen and sulphur similar to the decomposition products of albumen. This relationship is also shown by the work of the author on a new constituent of urine, which he has named *Urochromogen*, the presence of which in urine may be shown by Ehrlich's diazo-reaction. This substance is designated urochromogen β in distinction to the new compound which is named urochromogen *a*. Clear fresh urine is diluted with twice its volume of water, and this dilution twice repeated. To a few Cc. of this solution 3 drops of a 0.1 per cent. solution of potassium permanganate are added, when in presence of the new urochromogen *a* a distinct clear yellow color is developed which may readily be seen by comparison with the very pale color of a sample to which per-

manganate has not been added. In the absence of urochromogen *a* no change of color takes place, or at most a slight browning. In the opinion of the author the yellow color is due to the formation of urochrome, and urochromogen *β* thus appears to be a product of partial oxidation. Many samples of urine will only give Ehrlich's diazo-reaction after twenty-four hours' standing in the incubator, and therefore contain urochromogen *a*, which, on standing, is changed into the *β* form. The new reaction, on the other hand, is given by fresh urine.—Pharm. Journ. and Pharmacist, June 17, 1911, 809: from Pharm. Presse, 1911, 44.

Urine—Cause of Coloration when Heated with Nitric Acid.—C. J. Reichardt observes that the colorations developed in urine, particularly when it is heated with nitric acid of 20 per cent., are caused either by urinary coloring matters or are produced by the action of the nitric acid on carbohydrates—possibly also on compounds of the latter (for example "Mucins") with albumen—with formation of humus bodies.— In the case of urines having a specific gravity over 1.02 and which yielded a dark-red coloration on boiling with nitric acid, humus substances were always present in abundant quantities.—Pharm. Ztg., lv (1910), No. 63, 638.

Urine—Detection of Cryogenin.—G. Denigés finds that urine containing cryogenin, even after it has fermented, will yield a deep orange-yellow (brichromate-yellow) filtrate on treating 10 Cc. of the sample with 2 to 3 Gm. of lead oxide or manganese oxide and 5 to 6 drops of sodium hydroxide solution. In the presence of very little cryogenin the filtrate has a chromate-yellow color. If such urine is mixed with an equal volume of an acid solution of mercuric sulphate (5 Gm. HgO, 20 Cc. H_2SO_4, 100 Cc. H_2O) the cryogenin is oxidized, and a yellow solution is also produced; and if cryogenin is present in abundance, a salmon-red precipitate is formed in the urine on addition of an equal volume of mercuric acetate solution (5 Gm. to 100 Cc. water and 1 Cc. acetic acid.—Pharm. Ztg., lv (1910), No. 92, 929; from Bull. trav. Soc. Pharm. Bordeaux, 1910, 340, through Chem. Ztg., 1910, No. 126.

Urine—Quantitative Determination of Acetone.—According to Denigés, acetone cannot be extracted quantitatively from urine by means of ether, about two-thirds of the acetone remaining in the urine and only one-third passing into the ether on each renewal of the shaking-out process. In clinical examinations, therefore, requiring the determination of 0.04 to 0.05 of acetone, the methods of distillation, of polarization, and such of equal reliability, must be resorted to.—Pharm. Ztg., lvi (1901), No. 12, 117: from Bull. Soc. de Pharm. de Bordeau, *50* (1910), 516.

Urine—Nitrite Test for Indican.—Barberio comments on the great importance of examining the urine for indican as a sign of disease, and recommends a 1 : 2000 solution of sodium nitrite for the reagent. This keeps well. Two or three drops are mixed with 5 Cc. of filtered urine and well

shaken. Then 5 Cc. of concentrated hyprochloric acid and 2 Cc. of chloroform are added. The tint changes from clear yellow to violet; the chloroform, colorless at first, changes to blue, while the supernatant fluid is dark yellow, pinkish, or violet. Comparison of the findings with this method and with Obermayer's shows that the chloroform takes up the indigo blue more rapidly and intensely with the former. The rapidity of the technic avoids the formation of indirubin, and thus protects against another source of error, but its chief advantage is that the reagent, the sodium nitrite solution, is so easily prepared, so stable, and acts so promptly that it is well adapted for every-day routine practice.—Pharm. Journ. and Pharmacist, Aug. 12, 1911, 231; from Policlin. (Rome), April 23, 1911, through Jour. A. M. A., June 3, 1911, 1697.

Urine—Colorimetric Determination of Mercury.—A. Heinzelman finds that for the fairly accurate determination of minute quantities of mercury in urine such as it is necessary to make in carrying out observations on the excretion of mercury administered in different ways, colorimetric methods alone are sufficiently delicate. The method of Schumacher and Jung is the best hitherto proposed; this consists in first treating the urine with nascent chlorine, then reducing with zinc, when the mercury is liberated and forms an amalgam with the excess of zinc, dissolving the latter in hydrochloric acid with a little potassium chlorate, adding H_2S water, and comparing the depth of color produced with that given by known quantities of mercury. Investigation of the conditions to be observed at each stage of the process shows that at least four hours must be allowed for the reduction of the mercury and formation of an amalgam; that potassium chlorate should not be used in dissolving the latter; that free hydrochloric acid must be got rid of before the hydrogen sulphide is added, or the mercury sulphide will not be in the colloidal form necessary for comparisons; and that the two liquids to be compared should be of similar composition as regards other ingredients. By proceeding according to the details described by the author in the original paper very good results can be obtained with quantities of mercury under 2 Mgm. per liter of urine.—Pharm. Journ. and Pharmacist, Aug. 12, 1911, 231; from Chem. Ztg., July 4, 1911, 721.

Urine—Detection of Hypophosphites.—A. Patta recommends the following method for the detection of hypophosphites in urine: Phosphates are first precipitated from the urine, acidified with acetic acid, by means of uranium acetate. Half the filtrate from this is treated with hydrochloric acid, and then with mercuric chloride solution. After standing for twenty-four hours in the dark any hypophosphites present will have reduced the mercuric chloride to calomel, which is precipitated. The other half of the filtrate may be treated with nitric acid, when the phosphite thus formed from any hypophosphite can be titrated by means of standard solution of

uranium acetate. It is found that when phosphorus is administered as phosphate or phosphite, it is all excreted by the urine, unaltered, but with hypophosphites this is not the case. Except when very large doses of hypophosphites are given by injection, only traces are found in the urine.—Pharm. Journ. and Pharmacist, Nov. 19, 1910, 609; from Archivio. Farm. Sperim., 1910, *9*, 1, through Nouv. Remèd., *27*, 1910, 463.

CONSTITUTION AND BY-LAWS

OF THE

American Pharmaceutical Association

CONSTITUTION

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage such proper relations among Druggists, Pharmacists, Physicians, and the people at large, as may promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a General Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom shall be elected annually; also a Local Secretary to be elected by the Council. They shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the interest of which for any current year only may be used by the Association for its expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving

the votes of three-fourths of the members present, it shall become a part of this Constitution. Any proposition to amend the Constitution for the purpose of permitting the expenditure of the permanent invested funds of the Association, shall require a majority of seven-eighths for its passage.

BY-LAWS.

CHAPTER I.

Of the Election of Officers.

ARTICLE I. A Nominating Committee shall be annually chosen, whose duty it shall be annually, at the meeting, to select candidates for the offices of President, three Vice-Presidents and three members of the Council.

ARTICLE II. The Nominating Committee shall submit the names of three persons as candidates for each of the offices of President, First Vice-President, Second Vice-President, Third Vice-President, and three members of the Council. These names are to be submitted by the General Secretary by mail to every member of the Association, together with a request that the member indicate his preference on a ballot enclosed for that purpose, and return the same by mail within one month after the adjournment of the annual meeting.

ARTICLE III. The ballots received as indicated in the preceding article are to be sent by the General Secretary to a Board of Canvassers, composed of three members to be appointed by the President, who shall count as votes in the annual election only the votes of those members whose dues have been paid for the current year, and who in turn shall certify to the General Secretary the result of the election, after which the latter shall be published in the *Journal* of the Association

ARTICLE IV. The officers thus elected by a plurality of the votes cast shall be installed at the final general session of the next annual meeting.

ARTICLE V. The Reporter on the Progress of Pharmacy, the Treasurer and the General Secretary shall be elected annually by the Council.

CHAPTER II.

Of the Presidents and Vice-Presidents.

ARTICLE I. The President shall preside at all general sessions of the Association, except those of the special Sections, as hereinafter provided. In the event of his absence or inability to serve, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. At the sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to

the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in case where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, not provided for in the By-Laws or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER III.

Of the General Secretary.

ARTICLE I. The General Secretary shall be elected annually and shall receive from the Treasurer an annual salary not to exceed $1200, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve, on file, all reports, essays, and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Report on the Progress of Pharmacy, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose, shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every standing and special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act. He shall notify every member at least two weeks in advance of the time and place of each annual meeting.

CHAPTER IV.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the General Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the

custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists, may be held each year, should the Council so determine, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER V.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the General Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years.

ARTICLE IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary not to exceed $1,000, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $15,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by a Trust Company acceptable to the Council.

CHAPTER VI.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary not to exceed $1,200.

ARTICLE II. All journals and volumes received in exchange for the Report on the Progress of Pharmacy by the General Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the General Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; together with such data as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall be edited, published and distributed under rules and regulations approved by the Council. It shall be issued as a yearly volume, covering each fiscal year of the Association.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the General Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VII.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, to reduce any appropriations that have been made, whenever in their judgment the current receipts are not sufficient to allow the expenditure, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by vote of the Council, be permitted to speak on any subject under discussion.

ARTICLE II. The Council shall consist of *ex-officio* members; one member from each local branch of this Association and nine other members, selected from such members as have had at least three years' membership in this Association, shall be elected by ballot by the Association in the following order: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the place of those whose terms will then expire, to serve for the term of three years.

ARTICLE III. The President, Vice-Presidents, General Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, Editor-in-chief of the *Journal*, the Chairmen of the Sections of the Association, the Secretary of the Council, and the Historian of the Association shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and a Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, two standing committees of the Council—a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

Whenever deemed advisable by the Council, it shall after the publication of each edition of the National Formulary appoint a committee of fifteen members from the general membership of the Association, which committee shall have charge of the revision of the Formulary. This committee shall report annually or as often as required to the Council and shall continue to serve until the edition for which it was appointed has been completed. Vacancies occurring in this committee shall be filled by the Council as quickly as is expedient.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll of members, and the editing, publication and distribution of all the publications of the Association.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

ARTICLE IX. The Council shall furnish to each member of the Association, not in arrears, one copy of the Report on the Progress of Pharmacy, which publication shall contain, in addition to the report, a list of the officers and committees, prefatory matter, constitution and by-laws, general rules, roll of members, list of members, and such other matter as may be deemed desirable by the Council. It shall fix, also, the price for which copies of the Report may be sold.

ARTICLE X. The Council shall issue a monthly *Journal*, beginning in January, 1912, and thereafter under rules and regulations to be adopted by the Council, and shall furnish copies of such publication to each member of the Association not in arrears for subscription. The publication shall contain editorials, original articles, the proceedings of the annual meetings of the Council, and of the branches, and such other matter as may be deemed desirable by the Council.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, also editors and publishers of pharmaceutical journals, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, subscribe to them, are eligible to membership; provided that any person whose name has been dropped from the roll of members for non-payment of dues may be readmitted after having again made application in regular form, the application being accompanied by the usual fee; or he may be readmitted, without such application, on payment of all back dues; in the latter case his membership shall date from the time when he first joined the Association, as previously printed in the Roll of Members, and notice of such action shall be inserted in the addendum to the Treasurer's report.

ARTICLE II. Every application for membership shall require the endorsement of two members of the Association in good standing, and each applicant must receive the affirmative vote of three-fourths of the members of the Council for election, after which his membership shall be completed by his signing the Constitution and By-Laws and paying the annual dues for the current year. Any newly-elected member, upon the payment of the annual dues for the year in which he is elected, shall be entitled to the annual volume of the Report on the Progress of Pharmacy and such other publications of the Association as are distributed to its members free of charge during the year. Any application for membership made during the fiscal year (the calendar year shall be the fiscal year of the Association) shall apply to the current fiscal year; except between June and January, when, if desired, it can be made to apply to the *next* fiscal year, if so stated on the application. The publications will be sent for the fiscal year in which the dues and subscription are credited.

The price for the Report on the Progress of Pharmacy to *non-members* shall be fixed by the Council. The subscription price for the *Journal* of the Association shall be three dollars per annum to members and non-members alike. *The subscription to the Journal must be separate and distinct from the annual dues, although both may be paid at one and the same time.*

ARTICLE III. Every member shall pay *in advance* to the Treasurer the sum of *three dollars* as annual dues, and by neglecting to pay said contribution for *sixteen successive months*, may be dropped from the roll of members. If the annual dues (three dollars), and the annual subscription to the *Journal* (three dollars), be paid at one and the same time, a reduction of one dollar shall be allowed.

ARTICLE IV. Any member of the Association who shall pay to the Treasurer the sum of $100.00 during the first year of his connection therewith, and also any member not in arrears, who after ten years shall pay the sum of $75.00, or after fifteen years the sum of $50.00, or after twenty years the sum of $40.00, or after twenty-five years the sum of $25.00, and any member who may have paid annual dues for thirty-seven consecutive years, shall become a life-member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials shall be sent to the General Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Three Dollars* or of *Five Dollars*, to receive from the Treasurer respectively a *paper* or *parchment* certificate of membership signed by the President, one Vice-President, the General Secretary, and the Treasurer.

ARTICLE VII. Resignations of membership shall be made in writing to the General Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE VIII. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at a general session.

ARTICLE IX. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER IX.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, five Sections shall be formed, as follows: 1. Section on Scientific Papers; 2. Section on Commercial Interests; 3. Section on Practical Pharmacy and Dispensing; 4. Section on Pharmaceutical Legislation and Education; 5. Section on Historical Pharmacy.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read the minutes of Council, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered, and the Scientific Section shall commence its sessions in accord with the by-laws of said Scientific Section.

ARTICLE VI. At the fourth and fifth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VII. The eighth and ninth sessions shall be devoted to the subject of Practical Pharmacy and Dispensing.

ARTICLE VIII. The tenth session shall be devoted to the subject of Historical Pharmacy.

ARTICLE IX. A Chairman and a Secretary shall be elected by ballot by each section (except the Scientific Section which elects its officers in accord with the by-laws of said Scientific Section) to serve at the sessions of said Section. The minutes of each session, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the General Secretary for publication and safe-keeping.

ARTICLE X. The Chairman of each Section (except the Scientific Section whose officers act in accord with the by-laws of said Scientific Section) shall preside at each of its sessions, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the annual meeting.

ARTICLE XI. There shall be elected by each Section (except the Scientific Section which creates all committees in accord with the by-laws of said Scientific Section) a committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming standing committees of the Association.

ARTICLE XII. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the General Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. Reports of Committees shall be presented, read by their titles, synopsis or in full, and laid on the table for future consideration.

Section 6. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of

the members present; or, if disapproved by a majority of the members present, its acts shall be revised, so as to be acceptable to the Association.

Section 7. The President shall call the roll of States, the Territories, District of Columbia and the Provinces of Canada, requesting the members present from each State or Territory to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association, and members of the Council for the ensuing three years; in addition to which the President shall appoint five members from the Association at large to act with the Committee. Delegates who are not members must complete their membership before they are eligible to serve on the Nominating Committee.

Section 8. Incidental business.

ARTICLE XIII. The order of business at the second general session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read.

Section 4. Reading of the Minutes of the Council.

Section 5. Reading of the Reports of the Treasurer and General Secretary.

Section 6. Reports of Standing Committees shall be read.

Section 7. Reports of Special Committees shall be read.

Section 8. Incidental business.

Section 9. Adjournment subject to the call of the President.

ARTICLE XIV. The order of business for the sessions of the Sections shall be determined by each Section for itself.

ARTICLE XV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XVI. At the last general session of the Association the newly-elected officers of the Association shall take their respective places.

ARTICLE XVII. The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at these social sessions.

CHAPTER X.

Of Committees.

ARTICLE I. There shall be appointed or elected ten Standing Committees as follows: a Committee on the U. S. Pharmacopœia and a Committee on Transportation, each to consist of ten members; a Committee on the Pharmaceutical Syllabus, to consist of seven members; a Committee on the Time and Place of Meeting; a Committee on Commercial Interests and a Committee on Pharmaceutical Education and Legislation, each to consist of five members; a Committee on Practical Pharmacy and Dispensing, a Committee on Historical Pharmacy, a Committee on Ebert Prize, and a Committee on General Prizes, each to consist of three members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. It shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. It shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. Any person desiring to submit a paper to the Association shall present to the Chairman of the particular Section to which it refers, at least ten days prior to the meeting, an abstract of said paper, indicative of its contents, and consisting of not less than fifty nor more than two hundred words.

This abstract shall be printed as a part of the program. The paper itself must be submitted to the officers of the Section previous to the first session. Not more than ten minutes shall be allowed for the presentation of any paper, unless by unanimous consent of the Section. This does not apply to the Scientific Section, which handles its papers in accord with the By-Laws of said Scientific Section.

All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publications than those of the Association, except by the consent of the Committee on Publication.

ARTICLE IV. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Scientific Section, shall, at the next annual meeting after the one at which essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all respects it shall be governed by the stipulations expressed by the donor.

ARTICLE V. The Committee on General Prizes, which shall be appointed by the President, shall, at the next annual meeting after the one at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VI. The Committee on Practical Pharmacy and Dispensing, composed of members actually engaged in the retail drug business, shall be elected by the Section on Practical Pharmacy and Dispensing. It shall arrange in advance the business to come before the Section at the next annual meeting. It shall propose a series of subjects for general discussion, and solicit papers on subjects pertaining to the actual practice of pharmacy in retail stores.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. It shall report at each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. It shall arrange the business of the Section in advance of its sessions, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to it by the Section. It shall propose each year a subject for discussion at the meetings of the State Associations, and, at the following annual meeting of this Association, shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE VIII. The Committee on Historical Pharmacy shall be elected by the Section on Historical Pharmacy. It shall arrange the business of the Section and shall present annually matters of special historical interest in pharmacy. It shall also secure the collection of letters, papers, etc., written by members of the Association, which when so collected shall remain in the custody of the committee and be available for reference to any one interested.

ARTICLE IX. The Committee on the United States Pharmacopœia shall be appointed by the President of the Association, as follows: One member to be appointed for ten years and one for nine, eight, seven, six, five, four, three, two and one years respectively, each vacancy occurring by expiration of term to be filled by a new appointment for ten

years. The Committee shall elect its own Chairman annually. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia. It shall also note errors of any kind found in the U. S. Pharmacopœia, so as to facilitate and aid the work of the National Committee on Revision of the U. S. P.

ARTICLE X. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul or Minneapolis, Denver, Baltimore, Cleveland and San Francisco, and in conjunction with the General Secretary and the Local Secretary, who shall be members of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return. The Council shall annually elect the Chairman of this Committee.

ARTICLE XI. The Committee on the Pharmaceutical Syllabus shall be appointed by the President of the Association as follows: One member shall be appointed for seven years, and one for six, five, four, three, two and one years respectively; each vacancy occurring from expiration of term shall be filled for a term of seven years; other vacancies shall be filled at the annual meetings of the Association for the unexpired terms. This committee shall report to the Association through the Section on Pharmaceutical Legislation and Education, shall be members of the National Committee on the Pharmaceutical Syllabus and shall recommend to the Association its proportionate share of the current expenses.

CHAPTER XI.

Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the assembly and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order named. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

ARTICLE V. On all points of order not covered in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

CHAPTER XII.

Local Branches.

ARTICLE I. Local branches of this Association may be formed wherever it may appear that twenty-five members of this Association, in good standing, will participate, provided that no more than one such branch shall be formed in any one State, province, district or territory, unless the additional branches shall be formed at a point distant one hun-

dred miles or more from any branch already established in the same State, province, district or territory.

ARTICLE II. All active or voting members of local branches must be members of this Association in good standing.

ARTICLE III. The objects and aims of local branches of this Association shall be the same as set forth in Article I of the Constitution of this body, and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it. And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association.

ARTICLE IV. Each local branch having twenty-five active or voting members shall be entitled to elect one member every three years, who shall become and continue a member of the Council of this Association for that time.

CHAPTER XIII.

Miscellaneous.

ARTICLE I. Every proposition to alter or amend these By-Laws shall be submitted in writing at a general session, and may be balloted for at any subsequent general session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, a Vice-Chairman and a Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary not to exceed $300.

ARTICLE II. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting of the Council.

CHAPTER IV.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, together with the Editor-in-chief of the *Journal*, the General Secretary, the Reporter on the Progress of Pharmacy and the Treasurer as *ex-officio* members. The Council shall elect the Chairman.

ARTICLE II. The Committee on Publication shall have charge of the editing, publication and distribution of the Report on the Progress of Pharmacy and the *Journal* of the Association, and such other publications as may be issued, under rules and regulations to be approved by the Council.

ARTICLE III. The Editor-in-chief of the *Journal* shall be elected annually, and shall receive from the Treasurer for his services such compensation as the Council may direct.

ARTICLE IV. The Editor-in-chief of the *Journal* shall have charge of the editing, publication and distribution of the *Journal* subject to the rules and regulations of the Committee on Publication.

ARTICLE V. In case of illness or other inability of the Editor-in-chief to carry on the work of the *Journal*, the Committee on Publication shall be authorized to make the best arrangements possible to continue the work.

CHAPTER V.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members, who shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VI.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the General Secretary. It shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as it may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VII.

Of Sessions.

ARTICLE I. The Council shall meet previous to the assembling of the Association, and at such other times as it may determine, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special session shall be called.

ARTICLE III. Nine members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and the Secretary.
2. Election of the Standing Committees of Council, as follows:
   a. Committee on Finance, three members.
   b. Committee on Publication, five members.
   c. Committee on Centennial Fund, three members.
3. Unfinished and deferred business from the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session of the Council shall be read and approved.

CHAPTER VIII.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present, a majority of the votes cast being considered sufficient to decide a question. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the vote of three-fourths of the members present, it shall become a part of these By-Laws.

BY-LAWS OF THE SCIENTIFIC SECTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

SECTION I.

NAME.

ARTICLE I. This organization shall be known as the Scientific Section of the American Pharmaceutical Association.

SECTION II.

MEMBERSHIP.

ARTICLE I. All members of the American Pharmaceutical Association in good standing, who express a desire to do so, by registering their names with the Secretary of the Section, shall become members of the Section.

SECTION III.

OFFICERS.

ARTICLE I. The officers of the Section shall be a Chairman, a First Vice-Chairman, a Second Vice-Chairman and a Secretary, selected from members of the Section.

SECTION IV.

ELECTION OF OFFICERS.

ARTICLE I. The Chairman of the Section shall at the first session appoint a committee of three, who shall report to the Section at the same session two names for each office. At the last session of the Section these names shall be balloted upon, and the one receiving a majority for that particular office shall be declared elected. These shall then be installed and shall hold office for one year or until their successors are duly elected.

ARTICLE II. Officers may be re-elected, but with the exception of the Secretary shall not hold the same office for more than two consecutive years.

ARTICLE III. The Council of the Association shall fill any vacancies that may occur among the officers.

SECTION V.

DUTIES OF OFFICERS.

Chairman and Vice-Chairman.

ARTICLE I. It shall be the duty of the Chairman to represent the Section in the Council of the Association, to preside at the annual meetings of the Section, appoint all committees of the Section and fill any vacancies when occurring in these committees. He may present an annual address on any subject of interest to the Section that he may deem of sufficient importance.

ARTICLE II. In the absence of the Chairman the First Vice-Chairman shall preside and exercise all the functions of the Chairman.

ARTICLE III. In the absence of the Chairman and the First Vice-Chairman the Second Vice-Chairman shall preside and exercise all the functions of the Chairman.

ARTICLE IV. In the absence of all three of these officers the Section shall elect a temporary Chairman.

Secretary.

ARTICLE V. The Secretary shall keep a record of the proceedings of the Section, shall send to the members such notice as the business of the Section may require, shall transmit to the General Secretary the names of the officers and committees elected or appointed, and notify the General Secretary of any changes in the personnel of the officers or committees of the Section, and shall furnish the General Secretary a report of the sessions held at the annual meeting. The Secretary, at least two months in advance, shall write to each member of the Section, giving notice of the latest date upon which papers can be accepted for the program.

ARTICLE VI. The Secretary shall be custodian of the records and documents of the Section, as well as of all funds, and shall make all disbursements subject to the approval of the Chairman.

ARTICLE VII. The Secretary shall arrange the program for the annual meeting, and furnish the editor of the *Journal* of the Association the program for inclusion in the number just preceding the annual meeting.

ARTICLE VIII. The Secretary shall at each annual meeting present a brief report to the Association of the condition within the Section.

ARTICLE IX. In case the Secretary is unable to attend the annual meeting he shall notify the Council to that effect and the Council shall then appoint a temporary Secretary.

SECTION VI.

MEETINGS.

ARTICLE I. Sessions of the Section shall be held at each annual meeting of the Association. The first session shall be held at 3 o'clock on the afternoon following the second general session of the Association. Sessions may be held on subsequent days any time during the meeting when the officers of the Section may see fit, and by consent of the Council.

ARTICLE II. Provided, however, that these sessions be so arranged that they conflict as little as possible with sessions of other Sections, and that no session be held simultaneously with the final session of the Association.

SECTION VII.

ORDER OF BUSINESS.

ARTICLE I. The order of business at the first session shall be as follows: (1) Chairman's Address; (2) Secretary's Report; (3) Report of Standing Committees and Committees of the Association which report to this Section; (4) Nomination of Officers; (5) Miscellaneous Business; (6) Reading of Papers.

ARTICLE II. The time of the other sessions shall be taken up with the reading of papers, excepting as provided for in Section IV (Election of Officers) and Section X (Amendments) or to hear the reports of special committees.

ARTICLE III. Provided, however, that discussion of papers may be interrupted at any time to consider matters referred to the Section by the Association in general session or by the Council.

ARTICLE IV. This regular order of business may be suspended at any time during a session, for that particular session, by a three-fourths vote of those present.

SECTION VIII.

EXPENSES.

ARTICLE I. The expense of printing, postage and stationery shall be paid from the Association treasury, but in no case to exceed $25.00 for the one year.

ARTICLE II. Appropriations for expenses other than those named here must be procured by authority of Council through the Chairman of the Section.

SECTION IX.

PAPERS.

ARTICLE I. Original papers on any subject of scientific interest may be accepted at the discretion of the officers of the Section.

ARTICLE II. The complete title and a brief extract of all papers, not to exceed 250 words, must be in the hands of the Secretary in time for inclusion in the program which is published, as provided in Section V, Article 7.

ARTICLE III. Fifteen minutes shall be allowed for the reading of a paper. If the paper is too lengthy to be read in detail within this space of time, it shall be presented in abstract.

ARTICLE IV. Each speaker in the discussion of a paper shall be allowed five minutes, but all such discussion shall be confined to the paper or subject under consideration at that time.

ARTICLE V. The time allowed for presenting a paper or discussion may be extended by unanimous consent of those present.

ARTICLE VI. All papers and reports presented to the Section become the property of the Association and shall be forwarded to the editor of the *Journal* immediately following the annual meeting by the Secretary of the Section.

SECTION X.

AMENDMENTS.

ARTICLE I. These by-laws may be amended at the final session of any annual meeting by a two-third vote of those present, provided notice of such amendment is given together with the text thereof at any previous session held at that meeting. Amendments must finally be accepted by the Council as not in conflict with the Constitution and By-Laws of the Association.

SECTION XI.

MISCELLANEOUS.

ARTICLE I. Questions not specifically covered by these By-Laws shall always be decided in accord with the Constitution and By-Laws of the Association.

GENERAL RULES OF FINANCE.

ADOPTED 1883,

AMENDED 1885, 1887, 1888, 1895, 1900, 1901, 1903, 1909, 1910, 1912.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

"The correctness of the bill shall be certified to by the person contracting the same. After approval by the General Secretary, he shall endorse upon the bill the appropriation against which it is to be charged, and submit it to the Chairman of the Finance Committee for his approval. A warrant shall then be drawn and signed by the General Secretary and the President, upon receipt of which the Treasurer shall draw a check for the amount."

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Treasurer shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him.

Sixth, There shall be annually appointed by the Council an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, as that in which the Treasurer resides, the Chairman to be named by the Chairman of the Council.

Seventh, The Treasurer shall balance his books January 1st of each year, and shall make out, previous to the fifteenth day of January following, his annual report for the financial year just closed.

Eighth, The Treasurer, having thus balanced his books and made out his report, shall place all his books, accounts, vouchers, etc., with the report, at the disposal of the Chairman of the Auditing Committee, at such time and place in January of each year as said Chairman may direct.

The Treasurer, in the presence of another member of the Association, shall make a list of the numbers and amounts of the bonds belonging to the Association, and both shall make affidavit to such list, which shall then be forwarded to the Auditing Committee for their use in auditing the books of the officers of the Association.

Ninth, Said books, accounts, vouchers, saving-bank books and accounts of the same shall be returned to the Treasurer within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in January of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of February following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

Thirteenth, The Finance Committee shall each year, previous to January 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the coming fiscal year, the total of such appropriations to be based on the probable amount to be received from the annual dues for the coming year. No payment shall be made in excess of said appropriation except by special vote of the Council. All motions and resolutions involving the expenditure of any sum in excess of twenty-five dollars shall be referred to the Finance Committee before being acted upon by the Council. *Provided*, however, that the Treasurer shall be authorized to transfer from one account to another, such amount as may be needed at any time, the amount of any such transfer not to exceed the sum of fifty (50) dollars.

Fourteenth, All balances remaining from appropriations at the close of each fiscal year shall be turned back into the treasury, unless otherwise ordered by the Council.

Fifteenth, The Chairman of the Council is instructed to appoint three members of the Association who, together with the Treasurer, shall be known as the Committee on Invested, Savings and Trust Funds.

Of the three members first appointed, one shall be appointed for one year, one for two years and one for three years. Each year thereafter, one member shall be appointed for three years. Members of the committee need not be members of the Council.

It shall be the duty of the said committee to carefully consider the nature and status of all invested, savings and trust funds of the Association, and to make an annual written report upon the same to the Council, which report shall be read (in full) at one of the general sessions of the annual convention of the Association, and published in full in the annual volume of Proceedings thereof.

The present custody of the funds shall not be affected by the adoption of these resolutions, neither shall the committee have the power to invest or re-invest any of such funds, except as instructed by the Council or Association.

GENERAL RULES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the forty-seventh annual meeting of the American Pharmaceutical Association, held at Put-in-Bay, O., Sept. 4–12, 1899, the Council resolved that no advertisements be solicited or accepted for any of the publications or programs issued by or in the name of the Association, and the General Secretary was instructed to inform annually the Local Secretary and Pharmaceutical Press of the resolution.

At the annual meeting of 1907, held in New York City, it was ordered that the three-year term of members of the Council elected by local branches of the A. Ph. A. shall date from the last annual meeting of the Association held previous to the date of election of the new Council member by a local branch. (See Proc. 1907, p. 25.)

At the fifty-seventh annual meeting, held at Los Angeles, Cal., August, 1909, it was ordered that space be annually set aside in the Proceedings for abstracts of the proceedings of the meetings of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties.

It was further ordered that the salary year of the officers of the A. Ph. A. be changed so as to run from July of one year to July of the next year, instead of, as heretofore, from September to September. (See Proc. 1909, p. 452.)

It was also ordered that the names of life members, new style, be designated in the Roll and List of Members by means of heavy or black-faced type. (See Proc. 1909, p. 459.)

At the fifty-eighth annual meeting it was ordered that the Committee on Membership submit all names of applicants for membership to the respective State representative on the committee for approval before sending the application to the secretary of membership for submission to the vote of Council, or if they be sent direct to the secretary of the Committee on Membership they shall be sent by him, first to the State representative, for approval. The Secretary of the Council shall have discretionary power in the application of this rule.

It was further ordered that the resignation of a member may be accepted during the first six months of the fiscal year for which his annual dues are payable.

GEOGRAPHICAL ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

ENGLAND.

E. M. Holmes, F. L. S., *London*, 1899.

GERMANY.

Dr. Edward Schaer, *Strassburg*, 1877.

Dr. Hermann Schlenz, *Cassel.*

Dr. Ernst Schmidt, Geh. Regierungsrath, *Marburg*, 1899.

Dr. Arthur Meyer, *Marburg*, 1910.

INDIA.

David Hooper, F. I. C., F. C. S., *Calcutta*, 1899.

SWITZERLAND.

Dr. Alexander Tschirch, *Bern*, 1910.

ACTIVE MEMBERS.*

Members are requested to report any inaccuracies in these lists, and to notify the General Secretary and Treasurer of all changes of address.

(The names of Life Members in **black type.** Names of Life Members under the old Constitution in *italics.*)

UNITED STATES OF AMERICA.

ALABAMA—ALASKA—ARIZONA—ARKANSAS.

ALABAMA.

Auburn.

Miller, Emerson Romeo, B.S., M.S., Ph.C., Phar.D. 1895

Gadsen.

Vance, Winfield Scott 1909
Whorton, Carl 1908

Guntersville.

Thomason, William Pearce, Member Ala. Board Pharm. .. 1910

Mobile.

Eichold, Bernard Herbert 1905
Van Aller, Thomas S. 1907
Van Antwerp, James Callanan .. 1905

Montgomery.

Knabe, Gustavus Alexander 1876

Prattville.

Scott, Clarence Alexander 1905

Talladega.

McDiarmid, Daniel Palmer 1909

Tuscaloosa.

Bingham, William Ellison, A.B., Univ. of Miss. 1909

Tuskegee.

Lewis, Lawrence Campbell 1910

ALASKA.

Douglas.

Smith, Guy Livingstone 1909

Fort Gibbon.

Lyda, William Kerr, Sgt. 1Cl. H. C. U. S. A. 1912

Ketchikan.

Ryus, Floyd Eugene 1909

Saint Michael.

Mathews, Elmo Denton, Sgt. 1Cl. H. C. U. S. A. 1912

ARIZONA.

Prescott.

Brisley, Harry 1894

ARKANSAS.

Camden.

Morgan, Aylmer Lee 1890

Fort Smith.

Carnahan, John Hurley 1910
Sparks, James Mitchell 1894

Hope.

Gibson, John Sceva 1908

Hot Springs.

Beasley, Robert Sidney 1906
Eisle, Martin Augustine 1907
Hogaboom, George Adelbert ... 1907
Jennings, Algernon Coleman ... 1907
Klein, Ernest Frederick 1894
Lehman, Charles Walter, A.B... 1907
Mallory, Ernest E., Sgt. 1Cl. H. C. U. S. A. 1912
Muller, George William, Sgt. 1Cl. H. C. U. S. A. 1912

*List corrected to March 1, 1913.

Orth, Gustave, Corporal H. C. U. S. A. 1912
Praneuf, John, Sgt. 1Cl. H. C. U. S. A. 1912
Ransom, Louis 1911
Schachleiter, Francis George ... 1906

Jasper.

Arbaugh, Rufus C., Ph.G. 1912

Little Rock.

Bond, John Barnitz, M.D., Surgeon C. S. A. 1883
Dowdy, Joseph Franklin 1908
Snodgrass, Latta Kavanaugh 1901

Marianna.

Harrington, Vincent Moore, Jr.. 1909

Paragould.

Paris, James Ernest 1908

Piggott.

Potter, Maynard H., Ph.G., Ph.C. 1906

Pine Bluff.

Dewoody, William Lawrence ... 1887

Spadra.

Stewart, John William, Ph.G., Ph.M. 1908

Stuttgart.

Webb, John W. 1913

Warren.

Appleton, William Riley 1901

CALIFORNIA.

Alameda.

Sutherland, George McKenzie .. 1909

Arcata, Humboldt Co.

Keller, William Otto Emanuel.. 1908

Auburn.

Stevens, Frederick Solon 1903

Bakersfield.

Hughes, James A. 1909

Berkeley.

Jaffa, M. E. 1913

Burlingame.

West, Frederick 1906

Corning.

Dawson, Byron F. 1909

Eureka.

Bohmansson, Robert Hugo 1901
Correll, Eugene Philip 1909

Fort Baker.

Leahy, Michael 1912

Ft. Barry.

Cushman, Gabriel, Sgt. 1Cl. H. C. U. S. A. 1912

Fort McDowell.

Hamner, James Ferris 1906

Fortuna.

Bowman, Reginald Hamilton ... 1909

Fresno.

Smith, Geo. Henry 1909

Fruitvale.

Philip Waldemar Bruce, Ph.G., Phar.D. 1907

Gilroy.

Johnson, Edward Franklin 1909

Haywards.

Sporndli, Ernest 1906

Long Beach.

Lamb, James Amos 1909
Smith, Lauriston Stephen 1892
Yeomans, Sidney Clarence 1906

Los Angeles.

Binz, Edward Gabriel 1909
Dickinson, William Richard 1909
Freeman, James Joseph 1909
Guest, Wilbert Hillman 1909
Howard, Mrs. Fletcher 1905
Kirkland, Derwentwater 1889
Laux, Carl 1909
Mason, John G. 1911
Owen, Frank Dale 1907
Porter, G. Ellis 1909
Ramage, Robert Courtland 1909
Reilly, Robert C. 1901
Schiff, Ludwig 1912
Smith, Clarence Pennington 1890
Voeckell, Henry G. 1909
Watters, Alexander John 1909
Wilson, George Baright 1907

CALIFORNIA.

Merced.

Cody, Nelson Lowell Adams... 1909

Mountain View.

Wagner, Louis 1908

Oakland.

Leet, Robert Andrew 1907
Luck, Julius Alexander William. 1910
Varney, Edward Francis 1892

Ontario.

Jesson, Jacob 1872

Orland, Glenn Co.

Birch, May Cushman 1909
Harrington, Michael Timothy, Jr. 1908

Pasadena.

Leavitt, Adoniram Judson 1905
Ward, Charles Horatio 1909

Patton.

Dyna, Carl Frederick Julius, Ph.G. 1909

Sacramento.

Lichthardt, George Henry Philip, Ph.G. 1902

San Anselmo.

Hund, George Bernard 1910

San Diego.

Creighton, Mary 1912
Strahlmann, Edward 1909

San Francisco.

Ashim, Barach Jacob 1908
Baer, Edward Arthur 1907
Barbee, William David 1912
Berkowitz, Alexander, Sergt. 1st Cl. H. C., U. S. A. 1911
Bowerman, Kenneth Burton ... 1909
Boyken, John William 1902
Boyson, John Henry 1905
Briggs, Armand Eugene 1907
Brown, Clark L., Sgt. 1Cl. H. C. U. S. A. 1911
Carey, Henry Benjamin 1909
Dawson, John Henry, Ph.G. 1882
Donahue, Henry M. 1907
Esterly, Milton Theis, Sgt. 1Cl. H. C. U. S. A. 1912
Esters von Kraukau, James Henry William 1897
Fletcher, David M. 1904
Flint, John Henry 1909
Green, Franklin Theodore 1908
Headen, Claude Thomas, Ph.C.. 1909
Irving, Robert Burns 1912
Jorgenson, Edward B. 1902
Kornmuller, Wilhelm, Sgt. 1Cl. H. C. U. S. A. 1912
Kincaid, Kenneth G. 1912
Lachenbach, Fred Isadore, Ph.C. 1907
Lauer, Emanuel Hiram 1909
Lengfeld, Joseph Louis 1909
McDonnell, Herbert Leslie, Ph.G. 1908
Noreen, Matt Robert, Sgt. 1Cl. H. C. U. S. A. 1912
Poehner, Adolf Adam, Ph.G. M.D. 1907
Prior, Toney 1905
Roehr, Clarissa May 1908
Rogers, Edward 1902
Schmidt, Valentine, B.S., M.S., M.D., Ph.D. 1887
Schneider, Albert, B.S., M.S., M.D., Ph.D. 1899
Sharp, Solomon Albert 1902
Smith, Carl Edward 1912
Stange, Carl Frederick, Ph.G.... 1897
Steele, James Gurden 1859
Stein, Leslie Howard 1912
Taylor, Walter Thomas 1907
Wagner, George W. 1912
Wenzell, William Theodore 1870
Winter, James Henry 1904
Zieg, John 1912

Sanger.

Brehler, Oscar August 1909

San José.

Munson, James Grant 1908
Pellerano, Nicholas Andrew ... 1909

San Mateo.

Baskette, Frank E. 1907

Santa Ana.

Kelley, Charles Sprewell 1909

Sebastopol.

Worth, Thomas Renfro 1909

South Berkeley.
McGee, Stewart Thomas 1912

Stanford University.
Crawford, Albert C. 1912

Turlock.
Hudiberg, Alfred, Ph.C. 1912

Vallejo.
Hammar, Alrick, Chief Pharmacist U. S. Navy 1897

COLORADO.

Akron.
Van Liew, William Kirk 1912

Aspen.
Killey, Robert Smith, Ph.G. 1913

Boulder.
Fine, Eben Givens 1913
Washburn, Homer Charles 1905

Canon City.
Egbers, Lloyd 1913

Central City.
Best, John 1886
Davies, Llewellyn Powell 1891

Colorado City.
Meyer, Walter Ferdinand 1912

Colorado Springs.
Butcher, David Yerbey 1910

Cripple Creek.
Lewis, Griffith R. 1909

Delta.
Harding, Chester Ernest, Ph.G.. 1911

Denver.
Alkire, Lewis L. 1908
Austin, Frank A. 1910
Beukma, William 1913
Bresler, Simon L. 1908
Campbell, William Boyd 1913
Charles, Corlis Duffy 1913
Clark, Alfred William 1908
Clayton, Charles J. 1905
Cole, Adelbert C. 1913
Cordes, Henry 1913
Eberhardt, Edward 1912
Ford, Charles Mangan 1887
Healy, Edgar C. 1912
Hensel, Samuel Theodore, Ph.G. 1913
Hover, William Adgate 1895
Jeancon, Louis Augustus 1912
Kober, Carl B. 1912
Lagasse, Victor Scott 1912
Lewark, Ovid B. 1913
Lord, Frank Jotham 1912
McKenzie, Robert Henry, Ph.G. 1908
Martin, John Albert 1909
Myers, Wilbur G. 1913
Nitardy, Ferdinand Wilhelm ... 1905
Payne, Winfield Scott, B.A. 1913
Powers, Emmett 1912
Ryan, Alonzo S. 1913
Secheverell, Hugh Bennett 1913
Schlotz, Edmund L. 1913
Schlotz, William O. 1913
Seymour, Benjamin Franklin, Jr. 1912
Seymour, James 1903
Skinner, Charles H. 1909
Snider, Herbert M. 1913
Swoboda, Adolph 1909
Trent, William Walter 1910
Wallbrach, Arthur 1881
Ward, Augustus Jae 1893
Weimer, Carl G. 1913
Wilson, Lincoln 1910
Wobido, William J. 1912

Fort Collins.
Scott, Alexander Weir 1906

Fowler.
Palmer, William Gordon 1909

Glenwood Springs.
Barnes, Charles Dean 1908

Grand Junction.
Emerson, Irving Lewis 1913

Hayden.
Downs, Fred Clayton 1913

Lafayette.
Dow, John Peter 1904

Lamar.
Woods, Samuel Ross, Ph.G. 1913
Zimmer, William A. 1913

Las Animas.

Cooke, Maynard Ellsworth 1913
Cunning, George Albert 1913

Leadville.

Kolsch, Julius 1902
Whitmore, George Comings 1912

Longmont.

Witting, Frederick Frank, Ph.G.. 1902

Pueblo.

Mortenson, Frank Emil, Ph.G. .. 1910

Rollinsville.

Longnecker, Holton, Ph.G. 1913

Salida.

Bode, Theodore Christian 1912

Steamboat Springs.

Green, William W. 1913

Sterling.

Bauman, Charles R. 1913

Sugar City.

Hamilton, Robert Allen 1912

Yuma.

Dakan, Eugene S. 1910

COLUMBIA, DISTRICT OF.

Anacostia.

Weiss, Conrad Henry 1900

Washington.

Abner, Frederick George 1912
Alsberg, C. L., A.B., A.M., M.D.. 1912
Boyd, Geo. Washington Francis.. 1912
Boyd, George Washington 1883
Bradbury, Wymond Henry, Phar.D. 1895
Davis, Harry Alexander 1911
Doolittle, Roscoe Edward, B.S... 1909
Easterday, Herbert Clifton, Phar.D. 1893
Flemer, Louis 1895
Floyd, Henry Bussey 1908
Franzoni, Joseph Dunbar 1900
Gahn, Henry 1902
Hale, William Worth 1910
Henry, Frank Clinton 1894
Hilton, Samuel Lewis, Phar.D..... 1890
Hoover, George William 1905
Hunt, Reid 1904
Hurlebaus, George William 1895
Kalusowski, Henry E. 1904
Kebler, Lyman Frederic 1894
Keemer, Edgar Brookes 1907
La Grange, John V., A.M., Ph.G. 1905
Meade, Harold Barr 1910
Oehsen, Herman von 1911
Pearson, Paul 1908
Quigley, Richard Lucien 1902
Rabak, Frank 1905
Richardson, Willard Stowell 1900
Riley, John Thomas, Sgt. 1Cl. H. C. U. S. A. 1912
Scott, Edgar Burroughs 1905
Sievers, Arthur 1906
Spire, William Barton, Phar.D.. 1908
Stevens, Edward 1903
Taylor, Augustus Carrier 1900
Tracey, Augustus 1911
True, Rodney Howard, B.S., M.S., Ph.D. 1904
Vane, Patrick P. 1911
Weller, Franklin Pierce 1900
White, Joseph Leyden 1909
Whitmarsh, Paul, Sgt. 1Cl. H. C. U. S. A. 1912
Wilbert, Martin Inventius 1902
Wiley, Harvey Washington 1902
Zerbin, August 1912

Tacoma Park.

Barker, Quentin Johnstone, Sgt. 1Cl. H. C. U. S. A. 1912
Newport, John Freeman 1912
Thuney, Francis Edward 1911

CONNECTICUT.

Bridgeport.

Cyrus, Karl O. 1913
Hindle, William Percy 1908
Jamieson, George Alexander 1903
Leverty, John Augustine 1900
Ostrofsky, Frank Joseph 1910

Danielson.

Morin, Ludger Joseph 1905

Hartford.

Gladding, Curtis Parsons 1912
Seinsoth, John Jacob 1900
Stoughton, Mary A. (Mrs.) 1913

Meriden.

Mosher, William Wooster 1894

Middletown.

Pitt, John Rich 1872

New Haven.

Gessner, Emil Adolph 1878
Jenkins, Edward H. 1913
Spalding, Clarence Gilman 1910
Wood, James Prior 1890

Rockville.

Woodhall, Frederick 1908

Simsbury.

Lathrop, Arthur E. 1910

Stamford.

Weicker, Theodore 1905

Waterbury.

Ebbs, John Buddington 1905
Jones, John B. 1911
Wilcox, Levi, Ph.B. 1903

West Haven.

Andrews, William Augustus Peck. 1908

Willimantic.

Cartier, Gustave O. 1913

Winsted.

Judson, Arthur F. 1907

DELAWARE.

Seaford.

Kaufman, Reuben M., Ph.G. ... 1909

Wilmington.

Watson, Herbert Kennedy 1888

FLORIDA.

Brooksville.

Lemasters, William Otterbein .. 1905

Clearwater.

Allen, Bertram 1909

De Land.

Fisher, George Washington 1893

Gainesville.

Johnson, Washington M. 1910

Jacksonville.

Bettes, Charles C. 1909
Dixon, John Marion 1894
Jones, William D. 1913
Kirk, James Edgar, Ph.G. 1903
Norton, Edwin Massa 1913

Key West.

Simmons, Frederick S. 1911

Ocala.

Groves, Henry Conrad 1903

Ormond.

Thornton, Macon 1913

Palatka.

Ramsaur, David Wilfong 1902

Pensacola.

Petterson, Ernest Wilhelm 1905

Satsuma Heights.

Richtmann, William Oscar, Ph.G. B.S. 1904

St. Augustine.

Speer, Charles Claude 1902

Tallahassee.

Henry Arthur Malcolm, B.S. ... 1913

Tampa.

Berger, Ernest 1902

White Springs.

Maloy, W. J. 1913

GEORGIA.

Atlanta.

Elkin, William Simpson 1905
Payne, Dr. George Frederick .. 1893

Augusta.

Land, Robert Henry, Jr. 1902
Land, Robert Henry 1859
Neil, Mathew, Sgt. 1Cl. H. C. U. S. A. 1911

Greensboro.

Davison, Hal McClung 1911

Macon.

Morris, Max, Ph.G. 1898

Savannah.

Holt, Edwin Merrimon 1902
Rowlinski, Robert Antone 1892
Shuptrine, Herman Charlton 1912
Solomons, Isaiah Abraham 1894

Thomasville.

Thomas, Robert, Jr. 1888

HAWAIIAN ISLANDS.

Kalawao Molokar.

Gibson, Frank Leighton 1904

Honolulu.

Hermann, Christopher 1913

IDAHO.

Aberdeen.

Dvorak, Joseph Thomas 1908

Boise.

Ballou, Clarence Orlando 1909
Starrh, Thomas McLelland 1909

Buhl.

Elison, James Ross 1910

Grangeville.

Pulse, John J. 1908

Oakley.

Colpin, Emanuel E. 1907

Pocatello.

Buehler, John J. 1913
Whittelesey, Henry Hawley 1910

Twin Falls.

Skeels, Howard Morton, Ph.C... 1907
Spargus, Ray Miles 1910
Sprague, Adelbert N. 1910

ILLINOIS.

Arrowsmith.

Lester, George Friend 1910

Aurora.

Frauenhoff, Frederick Louis, Ph.G. 1909
Staudt, Louis Carl, Ph.G. 1890

Cairo.

Metzger, Matthias Clyde 1902
Schuh, Paul Gustav 1894

Camp Point.

Bartells, George C. 1881

Chicago.

Ackermann, Albert George, Ph.G. 1909
Adamick, Gustave Hattenhauer . 1891
Anderson, Carl Godfrey 1907
Avery, Charles Hamilton 1905
Backus, Edwin John 1913
Barrett, Marcus 1912
Bartlett, James E. 1906
Bartlett, Nicholas Gray 1861
Bate, Henry John 1906
Bauer, Jacob 1879
Becker, Irwin Atwood, B.S., Ph.G. 1905
Behrens, Emil Christian Lewis... 1893
Biermann, William Henry 1908
Blahnik, Marie (Mrs.) 1905
Blocki, John 1909
Bodemann, Wilhelm 1906
Boehm, John J. 1905
Brown, William Henry 1913
Bruder, Otto Emil, Ph.G. 1905
Brunn, Harold Nicholai 1905
Cannon, Claude Claybourne, Ph.G. Ph.C. 1910
Cannon, T. F. 1913
Christensen, Henry C. 1906
Clark, Albert Henry, Ph.G. 1905
Cooban, Benjamin Slater 1902
Crowley, James Patrick 1908
Day, William Baker, Ph.G. 1895
Druehl, Amanda Stahl (Mrs.).. 1903
Druehl, Louis A. 1908
Eicher, Benjamin L. 1912
Elisburg, Louis A. 1913
Engelhard, George Pierre 1903
Fantus, Bernard, M.D., Prof..... 1908
Fenger, Frederic 1910
Fischnar, John Ferdinand 1905
Forster, Isadore A. 1912
Fry, Herman 1902
Fry, Narcys George 1906
Fuller, Oliver Franklin 1869
Gathercoal, Edmund Norris, Ph.G. 1905
Goldstein, Jacob 1912
Gordin, Henry Mann, Ph.D. 1899
Grassly, Charles William 1884
Gray, Margaret McClintock (Mrs.) 1901
Gray, William 1892
Haesler, Loren Milton 1906

ILLINOIS.

Hartwig, Otto Julius 1892
Hellmuth, Joseph Anthony 1905
Hermanek, Joseph Charles 1904
Hilpert, Willis Store 1908
Holthoefer, Herman John 1912
Hood, Harry Alling 1910
Hottinger, Otto George 1910
Irvine, Ephraim Dinsmore 1908
Jamieson, Thomas Nevin **1903**
Jehlik, Anton Josef 1906
Jensen, Gerhard H. 1906
Josenhans, Reinhardt C. J., Ph.C. 1907
Kramer, Wilhelm 1908
Ladish, Erich Herman 1905
Larsen, Lars Peter, Ph.G. 1908
Lee, Orval W. 1912
Loesch, William 1912
Longstaff, William, Ph.C. 1910
Lorenz, John Stanley 1906
Lueder, John T. 1909
Mahaffy, John A. 1913
Mares, Frank Martin, Ph.G. 1902
Matthews, Charles Edwards 1893
McClugage, John Jordan, Ph.G.. 1905
McConnell, Charles Henry 1899
Meyer, Frederick Hugo 1907
Miller, Albert, Ph.G. 1907
Miner, Maurice Ashbel, Ph.C., Phar.D. 1880
Morrison, James William 1912
Myers, Charles Joseph 1905
Oglesby, George Daniel 1905
Oldberg, Oscar **1873**
Patterson, Charles Waggener ... 1905
Patterson, Theodore Henry 1869
Potts, Thomas Humphreys 1906
Puckner, William August, Ph.G. Phar.D. 1888
Rhode, Rudolph Ernst 1887
Sandoetter, Henry P. 1912
Sass, Stephen Konrad 1905
Scheips, Theodor I. 1905
Scherer, Andrew, Ph.G. 1884
Schimelfenig, Charles Howard .. 1908
Schmid, Louis A. 1911
Schmid, Rose Phillipus 1911
Schmidt, Frederick Michael.Ph.G. 1887
Secord, George Louis, M.S., Phar.D. 1910
Sheblessy, Michael Albert 1909
Snow, Clyde Mason, Ph.G., M.A. 1903
Snow, Herbert Waldemar, Ph.C. 1912
Snyder, Cloyde W. 1913
Snyder, William Edward, Ph.G.. 1909
Stadelmann, Harry Edgar 1909
Stephan, Otto Paul, Ph.G. 1909
Storer, Charles Adelbert 1906
Stuchlik, John 1913
Umenhofer, Adolph 1908
Van Schaack, Cornelius Peter .. 1905
Voiss, Arcadius **1901**
Warren, Louis Eugene 1909
Wells,James Herbert, Ph.G.,LL.B. 1908
Whitefield, Thomas **1865**
Williams, Seward Whiting **1887**
Wilson, Charles Frazee 1906
Winberg, Washington William .. 1906
Woltersdorf, Louis **1865**
Zeman, Otto 1911

Cicero.

Wicarius, Max John 1908

East St. Louis.

Burnette, Aaron G., ... 1912
Knoebel, Percy Thomas 1907
Knoebel, Thomas 1892

Elgin.

Herbster, Albert Logan 1912
Schultz, Charles Frederick Wm.. 1911

El Paso.

Michels, John B. 1913

Evanston.

Lee, John Victor 1910
Mills, George P. 1907

Fairmount.

Tilton, Claude Enoch 1905

Freeport.

McNess, Frederick William, P.D. 1906

Geneseo.

Stamm, Dante Milton 1896

Girard, Macoupin Co.

Deck, Lewis Cass 1901

Grayville.

Wheatcroft, John Christopher .. 1912

Greenup.

Conzet, Rufus Warren 1904

Jacksonville.

Shreve, Joseph F. 1912

Mascoutah.

Dauber, Curt Louis 1913

Maywood.

Whipple, Mathew K. 1913

Moline.

Brunstrom, Charles, Ph.G., Pres. R. I. Co. Retail Drug. Ass'n .. 1912
Lindvall, Charles Gustaf 1897
Sohrbeck, George Henry 1888
Sohrbeck, George William, Ph.G. 1897

Mt. Vernon.

Morse, Edward Worth 1896

Oak Park.

McCauley, Charles Edward 1903

Pekin.

Ehrlicher, Henry Michael 1892

Peoria.

Benton, Wilbur Merritt 1888
Lueder, Fritz 1894

Pesotum.

Hoffmann, Geo. Frederick, Ph.G. 1902

Quincy.

Achelpohl, Charles H. 1913
Dickhut, Lawrence August, Ph.G. 1910
Hagemann, Wm. Herman, Ph.G.. 1910
Heidbreder, Albert Henry 1905
Mueller, John Fred 1910

Rock Island.

Hartz, William Theodore 1909
Phares, Walter Lee, Sgt. 1st Cl. H. C., U. S. A. 1912
Riess, Adolph John 1909
Walker, Frederick Douglas Garnett, Ph.G., Opt.D. 1912

Rockford.

Freburg, Amel E. 1910

Salem.

Sweeney, A. J. 1911

Springfield.

Dodds, Frederick Clinton, Sec'y Ill. State Board Pharm. 1913
Dodds, Richard Newton 1902
Dorland, Ralph Erskine 1912

Stronghurst, Henderson Co.

Harter, Isaac Foster, M.D. 1893

Tuscola.

Stacy, Marion Franklin 1903

Urbana.

Beal, George D. 1907

West Salem.

Grace, Paul 1913

INDIANA.

Angola.

Sherrard, Charles Cornell 1893

Bluffton.

Stout, Marion Alphon, Ph.G. ... 1906

Columbus.

Otto, Theodore Gotthelf Edward. 1900
Stahlhuth, Ernst Heinrich Wilhelm, Ph.G. (Cincinnati) 1887

Elkhart.

Beardsley, Andrew H. 1913

Evansville.

Bohn, George W. 1907

Farmersburg.

Barbee, John J. Vandever, Jr. .. 1910

Ft. Wayne.

Mertz, Edward Leander 1904

Gary.

Wilcox, Russell C. 1912

Indianapolis.

Bibbins, Francis Eugene, Ph.G... 1909
Blodau, Robert P. 1908
Carter, Frank Henry 1891
Carter, Harlen Wilson 1908
Coons, William I. 1906
Eberhardt, Ernest Godlove, Ph.G. 1906
Eckler, Charles Ralph 1903
Eldred, Frank Randall 1905
Haskell, Charles Cheves 1912
Huder, Henry J. 1894
Hurty, John Newell, M.D., Phar.D. 1882
Kassulke, August 1905

Keene, Jerome J. 1910
Lilly, Eli 1906
Lilly, Josiah Kirby 1890
Lynn, Charles Jackson 1906
Miller, Fred Anderson 1913
Miller, Joy Lowell 1912
Mueller, J. George 1906
Pfafflin, Henry Adolph 1892
Pruyn, Murry K. 1912
Schwartz, Maurice Paul 1906
Showalter, Ralph W. 1913
Stucky, Edward W., Ph.B., A.M. 1908
Thorburn, Albert David 1902
Watkins, Charles William 1907
Werner, William F. 1908
Woods, Charles S. 1913

Kouts.

Benkle, John Gottlieb 1910

Lafayette.

Dewey, Albert H., Ph.G., B.S., M.S. 1909
Gidley, William Francis, Ph.C., B.S. 1910
Jordon, Charles B., Ph.C., B.S., M.S. 1909
Schultz, John Jacob 1904

La Porte.

Meissner, Frederick William, Jr., Ph.G. 1890

Logansport.

Hoffman, George William 1904

Lowell.

Alberts, M. Lee 1912

Mt. Vernon.

Fogas, William Henry, Ph.G.... 1907

New Albany.

Knoefel, Bruno 1896

New Carlisle.

Warner, Francis Delop 1904

Notre Dame.

Green, Robert Lee 1906

Rockport.

Basye, Taylor Colman 1909

Salem.

Robertson, Charles A. 1912
Rudder, William Hiram, Ph.G...1907

Seymour.

Loertz, Carl Edward 1907

South Bend.

Bastian, Otto Carl 1903
Kuss, Ralph Henry 1911
Meyer, Martin Monroe 1897
Reyer, Emil, Ph.G. 1907

Troy.

Gaesser, Theobald Theodore, Ph.G. 1901

Valparaiso.

Heineman, Albert F. 1905
Linton, Arthur Wilson 1910
Roe, Joseph Newton 1902
Timmons, George Demming, Ph.G., B.S., Ph.C. 1905

Warren.

Hickerson, William Henry 1894

West Terre Haute.

Cassady, Burton 1909

Winchester.

Sala, Albert Franklin 1905

IOWA.

Amana.

Koch, August Frank, Ph.G. 1903
Schadt, Conrad, R.P. 1903

Ames.

Gaessler, William George 1912

Boone.

Ridgway, Lemuel Augustus 1882

Cedar Rapids.

Boyson, George H. 1908

Clear Lake.

Etzel, John Leonhardt 1897

Clinton.

John, Milo Jesse 1910

Davenport.

Ballard, John Winthrop, Ph.G.... 1871

Denison.

Schlumberger, Anna Babette 1913
Schlumberger, Philip August ... 1913

Des Moines.

Berner, Carl Albert 1903
Kagy, Elbert O., Ph.G., Ph.C. .. 1913
Parker, Robert Lemuel 1912

Dow City.

Anderson, Ingewald A., Ph.G. .. 1913

Ft. Des Moines.

Ferguson, Robert Sydney 1911

Ft. Dodge.

Oleson, Olaf Martin 1877

Ft. Madison.

Schafer, George Henry 1871

Homestead.

Miller, Frederick William 1902

Hull.

Coad, William A. 1911

Iowa City.

Boerner, Emil Louis 1877
Cooper, Zada Mary, Ph.G. 1909
Kuever, R. R., Ph.G., Ph.C. 1912
Teeters, Wilber John 1902

Keokuk

Kiedaisch, George Arthur 1904
Parsons, George L., Ph.G. 1912

Lowden.

Jurgensen, Peter H. 1911

Maquoketa.

Nitzsche, John Charles 1909

Marshalltown.

Mayer, Peter 1906

Muscatine.

Halstead, Alice Louisa (Mrs.).. 1892
Springer, Harry Hoopes 1911

Plover.

Larsen, Martin 1906

Salem.

Pierce, Ira Hotchkiss 1913

Sioux City.

Scherlung, Gustav, Ph.G. 1884
Soper, George M. 1909
Thelander, Creston Carlos 1902
Thompson, Edwin Thomas 1913

Waterloo.

Coontz, Floyd 1909

Winfield.

Lindly, John Milton, Phar.D. ... 1901

KANSAS.

Atchison.

Noll, Mathias, Ph.C. 1901

Beloit.

Bunch, J. George 1913

Denton.

Stewart, Allen Thomas 1913

Ellsworth.

Sherriff, William Ebenezer 1904

Ft. Leavenworth.

Crampton, Wesley E. 1912
Daily, George E. 1912
Forsyth, James W. 1912
Hardenbrook, Burton 1912
Kane, Harry Grant 1912
Killikelly, Henry 1912
Rose, Martin 1911

Ft. Riley.

Blanche, Robert H. 1912
Raymond, Jack 1912

Gypsum City, Saline Co.

Schmitter, Jonathan 1892

Humboldt.

Hess, W. I. 1913

Lawrence.

Dick, William D. 1912
Havenhill, L. D. 1900
Leis, George 1869
Moore, John Thomas 1888
Sayre, Lucius Elmer 1883
Sterling, Charles Morgan, A.B... 1911
Stevenson, Arthur Earl 1912
Varnum, Walter Howard 1912
Watson, George Nathaniel 1910

Le Roy.

Fleming, John S. 1910

Marysville.

Riesen, David V. 1909

Ottowa.

Becker, Charles Lewis, Ph.C.... 1892

Overbrook.

Topping, Arthur Ellsworth, Ph.G. 1904

Pittsburg.

Lowman, Robert 1910

Scandia.

Nywall, David Alfred, B.S., Ph.G. 1910

Troy.

Sinclair, Edward Albert, Ph.C... 1913

Wichita.

Chism, John Samuel, Ph.G. 1909
Frazier, William John 1909
Henrion, Walter S. 1911

Winfield.

Bird, Richard B. 1910
Friedenburg, Maximilian Wilmer 1904

KENTUCKY.

Covington.

Pieck, Edward Ludwig 1887

Frankfort.

Gayle, John William 1891

Hawesville.

Patterson, George Orville 1907

Henderson.

Elam, John Thomas 1907

Lexington.

Brown, Linwood Arnold, Ph.C., Pharm.D. 1909
Caden, Alice 1912
Cassell, Robert Lee 1910
Cooper, James Evans 1907
Harting, Rudolph R. 1902

Louisville.

Buschemeyer, Henry, Jr. 1909
Diehl, Conrad Lewis, Ph.M. 1863
Dilly, Oscar Charles 1888
Dimmitt, Addison 1895
Eisele, George 1908
Hurley, Horace Oliver 1907
Jones, Simon Newton 1870
Krul, John George, Ph.G. 1907
Mueller, Otto Edward 1907
Newman, George Abner 1866
Overton, Burr Martin 1903
Schlosser, Peter 1902
Votteler, William 1895
Weiss, William J. 1910

Newport.

Bange, Otto Franz 1904
Gruele, Albert Martin 1903

Paducah.

Rawleigh, George Nelson, Ph.G. 1912
Welsh, Joseph Bruner 1910

Paris.

Clark, Charles Jordan 1904

Winchester.

Martin, James Henderson, Ph.G. 1908

LOUISIANA.

Alexandria.

Siess, Leo Chester, Ph.G. 1909

Natchitoches.

McClung, E. L. 1910

New Orleans.

Asher, Philip 1905
Capdau, Pierre August 1902
Claren, George Victor 1909
Di Trapani, Anthony 1909
Earhart, Frederick A. 1904
Feldner, George D. 1913
Godbold, Fabius Chapman 1887
Grasser, John J. 1909
Guidry, Ambrose Joseph 1903
Humphreys, George S. 1910
Kaczoroski, Adolph O. 1909
Legendre, Joseph Amilcar 1891
Levy, William Michael 1894
Lyons, Lucien Eugene 1904
Metz, Abraham Lewis 1887
Miller, Charles 1897
Sampson, Max 1900
Sauvinet, Charles Daniel 1902
Timbrook, Delfert 1912
Walsdorf, Edward H. 1904
Wirth, Adam, Ph.M. 1904
Wunderlich, Edward 1891

MAINE.

Auburn.

Burnaham, Ralph Foster 1904
Jones, Oscar Winthrop 1902

Augusta.

Coughlin, John 1908
Patridge, Frank Reuben 1895

Bangor.

Chase, Walter Melville, B.S. 1911
Davis, Charles Howard 1903
Sweet, Caldwell 1881

Brunswick.

Wilson, Frederick Henry 1906

Danforth.

Osborne, William, Jr. 1913
Porter, Martin Luther 1904

Farmington.

Marr, Leon H. 1912

Fort Fairfield.

Buxton, Horace Childs 1910

Gardiner.

Beane, Chester Hunnewill 1909

Kennebunk.

Meserve, Albert Wesley, A.M. B.A. 1905

Lewiston.

Babcock, Percival Warren 1909

Machias.

Crane, Frank Trussell, Ph.G... 1910

Milton Station.

Tibbetts, Weldon Eugene 1912

Orono.

Jackman, Wilbur Fisk 1899

Portland.

Cook, Alfred Page 1902
Frye, George Carlton 1879
Hay, Edward Allston 1889
Morse, Frank Dana 1902
Perkins, Benjamin Abbott 1878
Schlotterbeck, Augustus George. 1896
Simmel, Martin, Sgt. 1st Cl. H. C., U. S. A. 1911
Tuttle, George O. 1907

Sanford.

Wood, William Henry 1910

Skowhegan.

Bucknam, Frank William 1907

Waterville.

Vose, George Ellery 1910

Wilton.

Parlin, Ernest Parkhurst 1910

MARYLAND.

Annapolis.

Henkel, Charles Bernard 1902
Pearson, Joseph Frederick, Chief Pharm. U. S. Navy 1897

Arlington.

Roberts, Joseph Critell 1910

Baltimore.

Base, Daniel, A.B., Ph.D. 1898
Black, James Aitken, Phar.D... 1910
Brack, Charles Emil 1876
Bierman, Clarence H. 1908
Caspari, Charles, Jr. 1883
Cook, Parker 1910
Culbreth, David Marvel Reynolds. 1883
Daneker, Howard Nelson 1907
Dickson, Frederick W. 1906
Dohme, Alfred Robert Louis... 1891
Dunning, Henry Armit Brown, Phar.D. 1902
Elliott, Henry Alexander 1859
Engelhardt, Hermann 1907
Feick, Charles 1901
Fouch, William M. 1906
Frames, John Fuller, Ph.G. 1890
Gilpin, Henry Brooke 1889
Hancock, James Etchberger ... 1907
Hancock, John Francis 1863
Hengst, John Edwin 1900
Heuisler, Philip Ignatius 1903
Hodson, Eugene Withers 1907
Hynson, Henry Parr 1890
Maisch, Henry 1898
Mansfield, Samuel 1898
Meyer, Charles Lewis 1901
Millard, David Rockwell 1899
Miller, Clifford O., Phar.D. 1912
Muth, George Giustiniani 1906

Muth, John Clement 1898
Muth, John Sebastian 1898
Neal, Charles Chaplin 1906
Neubauer, Clarence George 1910
Schulze, Louis, Ph.G. 1892
Schumann, Otto George 1902
Shulman, Jacob A. 1910
Smith, Theodoric 1890
Sonnenburg, Charles Edward .. 1909
Sullivan, John Patrick 1909
Thomas, John Benjamin 1906
Walz, Jacob Lee 1906
Ware, Charles Howard 1898
Werckshagen, Otto 1907
Wescott, James Walling, Ph.G.. 1890
Whittle, William Aloysius 1908
Wich, Henry Edward 1909
Williams, Lawrence Soper 1910
Winklemann, John Henry 1864
Wolf, Charles Augustus 1906
Wolf, James Carlton 1905
Wolf, Michael Francis 1906

Catonsville.

Simon, William 1885

Chestertown.

Stam, Donald Ferguson 1910
Toulson, Milbourne Asbury, Ph.G. 1905

Chevy Chase.

Henkel, Alice, Assistant U. S. Dept. Agr. 1902

Cumberland.

Holtzmann, Charles 1911

Denton.

Redden, Charles Henry 1911

Frederick.

Keller, Jacob Heisely 1911
Pearre, Albert Lindsay 1906

Frostburg.

Pearce, George Ellsworth 1911

Hagerstown.

Meredith, Harry Lionel 1900

Relay, Baltimore Co.

Hindes, Joseph Frey 1910

Roland Park.

Kelly, Evander Frank, Phar.D.. 1905
Morgan, Charles 1899

Salisbury.

White, Edward Riall 1911

Snow Hill.

Powell, William Cottingham ... 1895

Sykesville.

Swain, Robert Lee 1909

Taneytown.

McKinney, Robert Sentman, Ph.G. 1898

MASSACHUSETTS.

Amherst.

Deuel, C. Fred 1907

Andover.

Stacey, Franklin Horton, Ph.C., Phar.D. 1910

Arlington.

Murphy, Robert William 1911

Beverly.

Delaney, Thomas F. 1910

Boston.

Ackerman, Adolf Henry, Phar.D. 1910
Baker, Walter Nelson 1906
Bassett, Charles Harrison, Ph.G. 1867
Bigelow, Edward Fisher 1912
Blake, Harry Wilmarth 1909
Bradley, Theodore James 1896
Brown, Frank L. 1912
Burleigh, Edwin Porter 1911
Burnaham, Alfred Augustus, Jr. 1891
Burroughs, Geo. Lawrence, Ph.G. 1910
Cabitt, Harry 1909
Carter, Frederick Louis 1905
Carter, Frederick Louis, Jr. ... 1912
Corner, William 1911
Drury, Linus Dana, Ph.G. 1871
Finneran, James Francis 1906
Flaherty, Patrick J. 1912
Geddes, Lillian M. 1912
Godding, John Granville, Ph.G... 1875
Goodwin, Howard 1910
Griffin, Lyman Whiting 1907
Hagar, Joseph C. 1910

MASSACHUSETTS.

Kelley, Gustavus A. 1910
Lyons, Michael Francis 1910
Marshall, Ernest C. 1910
McIntyre, Martin J. 1910
Monnier, Ernest 1913
Muldoon, Hugh Cornelius, Ph.G. 1913
O'Brien, James M. 1910
O'Brien, Thomas James, Ph.G... 1911
Owen, Fred S. 1911
Perry, Henry William 1910
Pierce, William Herbert 1879
Sawyer, John R. 1908
Sawyer, Wm. Frederick, Phar.D. 1885
Sharpless, Stephen Paschall, S.B. 1875
Sheppard, Samuel Arus Darlington. 1865
Smith, Howard Harry, Ph.G., M.D. 1911
Staehli, Theodore H. 1912
Thompson, Leon Albert, Phar.D. 1907
Vargas, Heredia Jorge 1891
West, Charles Alfred 1892
Wiggin, Harry Carleton 1910
Williams, George Gorham 1888
Wolff, Daniel Oliver 1909
Wooten, Thomas Victor, Ph.G.. 1893

Brighton.

Towse, Clarence W. 1911

Brockton.

Randall, Frank Otis 1893

Brookline.

Clapp, Lowell Tuckerman 1905
Gammon, Irving Parker 1906
Hitchcock, Charles H. 1910
Morey, Arthur C., Ph.G. 1911

Cambridge.

Acheson, William R. 1910
Hawthorne, Herman Francis ... 1909
LaPierre, Elie Henry, Ph.G. 1892
McCormick, Peter Joseph 1909
Norton, George Edward 1895
Stover, Charles Albert, Ph.G... 1909

Chelsea.

Berkowitz, Morris Emanuel 1910

Chicopee.

Dalton, Ernest 1913

Concord.

Richardson, Horatio Stillman .. 1892

Dorchester.

Archer, Frederick 1913
Connolly, Frederick Wm., Ph.G.. 1907
Oppe, Samuel A. 1911

Dorchester Center.

Coleman, George Edward 1912
Tripp, Arthur Horton 1906

East Boston.

Kinnier, Patrick J. 1910
Packard, Charles Herbert 1906
Woodbury, Frank A. 1910

Everett.

Wagner, Arthur Carl 1907

Fall River.

Brunelle, Albert Joseph 1910
Corrigan, Dominick F. 1912
Hardie, William 1913
Riddell, Benjamin Franklin 1892

Fitchburg.

Estabrook, Henry Arthur 1886

Fort Andrews.

Gorton, Glen D. 1911

Fort Banks.

Sands, John R. 1911

Groton.

Bruce, Harry L. 1910

Holyoke.

Heinritz, Lebrecht Gustav 1902

Hudson.

Toohey, Matthew Frederick 1911
Wheeler, Carlton Bancroft, Pharm.D. 1907

Jamaica Plain.

Lewis, Ernest Grant 1892
Smith, Linville Holton 1892

Lawrence.

Call, Harry Burrett 1909
Demere, Francis Xavier 1912
Dubrule, Rosaire 1909
Glover, William Henry, Ph.G.... 1891

Leominster.

Nixon, Charles Frederic, Ph.G... 1900

MASSACHUSETTS.

Lowell.

Bailey, Frederick 1869
Donoghue, Richard Sheridan ... 1910
Hood, Charles Ira 1871
Willson, George Arnold 1906

Ludlow.

Booth, Albert Edward, Ph.G. .. 1907

Lynn.

De Coster, Harry Willson 1912
Ellis, Leon Clifton 1912

Malden.

Whitaker, William Henry 1910

Marlboro.

Barnard, Harry Ames, Ph.G. ... 1907

Maynard.

Dwinnell, H. J. 1912

Melrose.

Briry, William S., Ph.G. 1911
Ripley, Henry Milton 1910

New Bedford.

Blake, James Edwin 1866
Shurtleff, Israel Hammond 1875

Newburyport.

Davis, Charles Leland, Ph.G. ... 1897
Goodwin, William Wells 1853

Newton.

Crowdle, J. E. 1909
Hubbard, Frederick Arthur 1907
Hudson, Arthur 1882
Wilson, Benjamin Osgood 1859

Newton Center.

Hahn, William 1910

Newton Highlands.

Green, Jacob Hubert 1912
Waterhouse, Joseph Thomas ... 1910

Newton Lower Falls.

Sears, Carrie Leona 1910

North Cambridge.

Olive, George M. 1911
Saunders, William Houston, Ph.C. 1910

Pittsfield.

Bence, Eli 1910
Engstrom, Ernst Oscar, Ph.G... 1906

Plymouth.

Cooper, James W. 1909

Raynham.

Crossman, George Alvia 1872

Rosindale.

Wicker, Judson A. 1911

Sagamore.

Adams, James Holmes 1906

Salem.

Nichols, Thomas Boyden 1876

Shelburne Falls.

Baker, Edwin 1875

Somerville.

Grover, George Elmer 1910

Southborough.

Newton, Howard Chamberlain .. 1912
Newton, Robert Albro 1906

Springfield.

Leonard, Edward Fenno 1909
Lerche, Albert 1913

Stoneham.

Currier, Charles O. 1912
Emerson, Hermann Lincoln 1911
Patch, Edgar Leonard, Ph.G...... 1872

Taunton.

Ripley, Charles Ferrin 1910

Waltham.

Gleason, Patrick Sebastian 1904
Hudson, John Robert 1910

Waverly.

Burdette, Bernard Clarence 1911

Wellesley.

Fitzpatrick, Patrick Joseph 1908

West Medford.

Shedd, Edwin Walter 1910

West Roxbury.

Summer, Jennie Henrietta, Ph.G. 1909

Winchester.

Knight, Frank Herbert, A.B., Ph.G. 1909

Winthrop.

Lowe, David 1912
Murphy, George Edward, Sgt. 1Cl. H. C. U. S. A. 1912

Wollaston.

Hurlbert, William Alexander .. 1909

Worcester.

Brewer, Howard Dickinson 1902
Flint, William S. 1909
Guerin, James Francis 1898
Hadley, John Conant 1910
Scott, George Theodore 1883

MICHIGAN.

Ann Arbor.

Calkins, Eleazer E. 1903
Eberbach, Ottmar **1869**
Hubbard, Winfield Scott, Ph.G., B.S., M.A., Ph.D. 1912
Stevens, Alviso Burdette **1885**

Battle Creek.

Goodale, Martin H. 1910

Birmingham.

Cobb, James W. 1909

Coldwater.

Lyon, Arthur George 1909

Detroit.

Averyt, Henry Madison 1907
Farwell, Oliver Atkins 1912
Francis, John Miller, B.S., M.A. 1906
Gorenflo, Oscar William 1909
Graber, Howard Tyler 1910
Hall, William Alanson 1888
Hamilton, Herbert C., Chemical Engineer 1912
Hayward, Lawrence Barnes 1912
Helfman, John, A.B., B.S. 1913
Helfman, Joseph 1894
Houghton, Elijah Mark, Ph.C. M.D. 1889
Knox, James Wesley Thompson. 1898
Lyons, Albert Brown **1885**
Mallard, Albert E. 1907
Mann, Charles Frederick 1903
Mason, Harry Beckwith 1896
Miller, William Lewis, Ph.G. .. 1910
Nelson, Edwin Horatio 1904
Ohliger, Lewis Philip **1871**
Ohliger, Willard 1903
Ouellette, Oscar Eugene 1912
Perry, Frederick William Riley, Ph.C. 1885
Ryan, Frank Gibbs 1892
Schulz, Henry Louis 1905
Scott, William C. M. 1909
Scoville, Wilbur Lincoln 1891
Seltzer, Leonard Adams, Ph.C... 1899
Stevens, Grant W. 1910
Taylor, Francis Owen, Ph.C. ... 1912
Thompson, Frank Augustus, Ph.C. 1908
Vernor, James 1866
Weaver, Clarence Albert 1909
Webster, John Hugh, Ph.G. ... 1911
Wheeler, Albert Alton 1906

Flushing.

Sprague, Wesson Gage 1895

Fort Wayne.

Riess, Herman William, Sgt. 1st Cl. H. C., U. S. A. 1913
Sweeney, James 1911

Grand Rapids.

Jongejan, Cornelius Henry 1910
Kirchgessner, William Carl, Ph.C. 1903
Macdonald, Horace R. 1910

Ionia.

Gundrum, George 1882

Iron Mountain.

Seibert, George Frederick 1909

Jackson.

Thome, Edgar R., Ph.D. 1912

Kalamazoo.

Bugbee, Chas. A. 1912
Todd, Albert May 1885

Lansing.

Shannon, Fern L. 1910

Midland.

Austin, Edward William 1912

Pontiac.

Leisenring, Willis 1909

Port Huron.

Rodgers, Edward James 1909

Saginaw.

Heim, Henry 1900
Moeller, Adolphus R. 1911

MINNESOTA.

Alexandria.

Holverson, Henry T. 1909

Clear Lake.

Eckstein, Andrew Joseph 1895

Duluth.

Abbett, William Allen 1901

East Grand Forks.

Kingman, Ignatius 1904

Fergus Falls.

Biese, John Henry 1908

Ft. Snelling.

Vennemann, P. Heinrich, Sgt. 1st Cl. H. C., U. S. A. 1912

Hopkins.

Souba, Emil George 1911

Jackson.

Colby, Charles Ludwig 1904

Lindstrom.

Elfstrand, Wilhelm 1905

Minneapolis.

Allen, E. Floyd 1885
Bachman, Gustav 1905
Brewer, Justin Sewall 1912
Brownlee, Sherman Harry 1910
Butters, Charles Hayes 1907
Danek, John Francis 1895
Erkel, Arthur George, Ph.C. ... 1910
Gamble, Stewart 1897
Griffen, Truman 1909
Harrah, John William 1910
Haynes, Manley Hewitt 1912
Huhn, Charles Hugo, Ph.C. 1905
King, George Alexander Newton. 1892
Klenert, Frederick Alois 1910
Kulp, George Henry 1910
Newcomb, Edwin Leigh, P.D. .. 1906
Stuart, Josephine A. Wanous. .. 1897
Sweet, William Herbert 1905
Thompson, Albert Delano 1895
Wittich, Matthew Henry 1897
Wulling, Frederick John, Ph.G., LL. B. 1893

Ortonsville.

Nielson, John 1897

St. Paul.

Baillie, James 1912
Bollinger, Clifford H. 1912
Collier, William Kelly 1897
Conger, Frederic Albert 1907
Frost, William Arthur, Ph.G. .. 1892
Heller, Charles Tomkins 1906
Jelinek, John Peter 1907
McCall, Henry 1910
Messing, Richard J. 1913
Noyes, Charles Reinold, B.A. ... 1908
Parker, Frederick M. 1902
Rietzke, Herman W. 1909
Smith, Frederick Alfred Upsher, Ph.C. 1907
Westby, Severs 1907

St. Paul Park.

Biscoe, Thomas 1912

Stewartville.

Thomas, Glenn D. 1912

Winona.

Leeb, Theodore Feargod 1903

Worthington.

Morland, Robert Lawson 1909

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William 1883

Biloxi.

Stier, Carl, Ph.G. 1902

Heidelberg.

Lee, Irma Undine 1909

Meridian.

Kendall, Gus C. 1913

Port Gibson.

Shreve, John Alexander 1880

University.

Faser, Henry Minor 1910

MISSOURI.

Boonville.

Mittelbach, William, Ph.G. 1891

Brunswick.

Bowen, Cyrus West, B.S., M.S., M.D., Ph.G. 1912

Cape Girardeau.

Miller, Edwin Alexander, B.Pd., Ph.G. 1912
Miller, Isaiah Benjamin 1912

Carrollton.

Pettitt, Henry McEwen 1860

Gorin.

Estell, Holice 1910

Hannibal.

Ayres, Albert John, Ph.C. 1907

Higginsville.

Koppenbrink, Jesse Edmund 1913

Jefferson Barracks.

Down, Earl J. 1911
Noaks, Richard S. 1911
Wickett, Francis W. 1911
Young, George C. 1912

Jefferson City.

Brandenberger, Adolph 1894

Kansas City.

Amos, Wilbur Stanton 1908
Crampton, Ferd Leslie 1896
Faxon, Henry D. 1909
Federmann, William Martin 1901
Hess, Paul Ludwig 1892
Lamont, Wm. Hamilton 1912
Lee, Richard Henry 1904
Whitney, David Victory, Ph.G.. 1903
Wirthman, John George 1903
Wirthman, Joseph Charles 1903
Zinn, Charles Edward 1909

Linn Creek.

Moulder, Bettie Leona 1905

Malden.

Metzger, Arthur S., Ph.G., Ph.C. 1908

Mexico, Andrian Co.

Llewellyn, John Frederick 1867
Llewellyn, Frederick William, Ph.G. 1908

Nevado.

Ballagh, Wilfred Thomas 1901
Wardin, Ralph Lincoln, Ph.G. .. 1913

New Madrid.

Hummel, John Andrew 1901

St. Joseph.

Bender, Walter Comstock 1909
Burvenich, Anton 1909
McFall, Bernard Wright, Ph. G. 1912

St. Louis.

Blakeslee, Louis George 1903
Boehm, Solomon 1871
Buehler, Carl Theodore 1910
Caspari, Charles Edward 1902
Claus, Otto Ferdinand, M.D. .. 1901
Cloughly, Orval James 1913
Collins, George William 1911
Combs, Delta Erwin 1911
Coussens, Bettie Prince 1910
Daily, Augustus D. 1913
Falk, John Charles 1900
Fricke, Frederick Henry 1901
Gietner, Charles, Ph.G. 1905
Good, James Michener 1871
Grewe, Louis Frederick, Ph.G. .. 1901
Guy, Albert 1912
Hagee, William Price 1901
Hagenow, Theodore Frederick . 1901
Hahn, Charles Wm. John Henry. 1901
Haines, Frank Allen, Ph.G.,Ph.C. 1911
Hanser, Otto Charles 1910
Heckleman, C. A. 1912
Hemm, Francis 1881
Hickey, William Alexander 1912
Horton, Charles Henry, Phar.D. 1905
Huegel, Henry Otto Andrew ... 1909
Huffman, Bertha Grace 1911
Ilhardt, William Kellerman 1901
Ittner, William Frederick 1903
Judge, Charles Rogers 1901
Klie, George Henry Charles, Ph.G., M.D. 1878
Kring, Gustave 1912
Kurtz, Irwin William 1904
Lang, George, Jr. 1909
Lehman, Louis John, Ph.G. 1911

Lieberstein, Jacob 1913
Lieberstein, Louis, Ph.G. 1909
Lohmann, Garrett S. 1911
Mackelden, John William 1911
Mallinckrodt, Edward 1869
Marglous, Lawrence Roscoe 1912
Meisburger, Wm. J. 1913
Merrell, George Robert 1901
Merrell, Hubert Spencer, Jr., Ph.B. Ph.C. 1910
Meyer, Theodore Frederick 1901
Noll, Martin James, Ph.G. 1898
Overstreet, William Payne, Ph.G. 1893
Pauley, Frank Charles 1879
Schlueter, Robert Ernst, Ph.G., M.D. 1904
Schoenthaler, John Paul 1901
Schulte, Arthur Charles 1912
Seitz, Lorenz Aloysius 1901
Sennewald, Emil August 1900
Sizemore, Clarence R. 1911
Smith, Paul W. 1912
Sommers, George H. 1913
S'Renco, John Unlf 1912
Stolle, Henry Jasper 1903
Stuart, Francis Joseph 1913
Sultan, Frederick William 1901
Suppan, Leo Richard August .. 1904
Tyson, Lester Raymond 1912
Uhlich, Ferdinand Gottlieb 1881
Van Ness, George Ide 1904
Vordick, August Henry 1874
Walbridge, Cyrus Packard 1901
Wall, Otto Augustus 1884
Wasem, John 1911
Whelpley, Henry Milton, Ph.G., M.D. 1887
Wilkerson, Jerome Aloysius 1911
Williams, N. Emery, Ph.G. 1912
Wolff, Edward Henry 1901

Sedalia.

Bard, William E. 1901
Servant, Harry W. 1910
Smith, Otis W. 1903

Troy.

Bragg, William Sydnor, Jr. 1912

Webster Grove, St. Louis Co.

Mueller, Ambrose 1894

Windsor, Henry Co.

Wesner, Henry Clay 1901

MONTANA.

Billings.

Kehoe, Thomas M. 1910

Bozeman.

Kraker, John Lewis 1912
Mollett, Charles Edwin Francis, Ph.C. 1909

Butte.

Rockefeller, Howard 1900

Great Falls.

Woehner, Frederick A. 1909

Livingston.

Gross, Schuyler von Rennesslaer. 1912
Scheuber, Frank Augustus 1905

Missoula.

Bateman, Herbert Howard 1909
Coffee, Sidney J. 1909

NEBRASKA.

Arlington.

Weber, Don Caesar 1908

Auburn.

Dort, Edward Harvey 1903

Central City.

Lock, Herbert 1913

Clarks.

Keefe, Thomas 1913

Creston.

Ewing, Samuel E. 1913

Daykin.

Christian, Robert J. 1911

Fairbury.

Pease, Autumn Vine 1893

Fremont.

Koss, Frank 1907

Grand Island.

Brink, Fred A., Ph.G. 1913

Greeley.

Clough, Frank Harrington 1905

Hendley.

Ackermann, John J. 1913

Holbrook.

Butler, Guy 1909

Holdrege.

Fink, Daniel Jacob 1903

Kenesaw.

Mikkelson, Niels 1903

Lincoln.

Haschenburger, Edmund Ommen, Ph.G. 1907
Lyman, Rufus Ashley, A.B., A.M. M.D. 1908
Redfern, Ellsworth Lovejoy, B.S. 1913

Louisville.

Frater, Geo. 1909

McCook.

McConnell, Lewis William, Ph.G. 1904

Neleigh.

Reynolds, Frank E. 1913

Oconto.

Jones, Orel, Ph.G. 1911

Omaha.

Bexten, Edward William 1908
Cermak, Emil 1908
Fricke, Charles B. 1909
Gerald, Herbert Franklin 1906
Gering, Henry R. 1907
Green, James Harvey 1912
Kreizinger, Karl Ludwig 1907
Lane, Harry C. 1910
Lathrop, Charles Edward 1910
Mares, Ferdinand Lewis 1897
Myers, Preston Brown 1897
O'Brien, John Edward, Ph.C. ... 1913
Piel, Warner A. 1912
Sherman, Charles Rollin 1889
Yates, Edward T. 1912

Plattsmouth.

Fricke, Frederick George 1903

Wood River.

Hoye, Daniel J. 1911

Wynot.

Schulte, Alexander, Jr. 1908

NEVADA.

Elko.

Taber, Joseph Mark 1912

NEW HAMPSHIRE.

Berlin.

Lyford, Earl Howard, B.A., Ph.C. 1903

Hillsboro.

Moxley, Roland Rufus 1907

Manchester.

Knowlton, George Harry 1907

Nashua.

Rice, Herbert Eugene 1910

Portsmouth.

Grace, William Day 1896
Green, Benjamin 1888

Somersworth.

Hurd, John Charles 1892

NEW JERSEY.

Atlantic City.

Deakyne, Harry Hartup 1905

Bernardsville.

Squibb, Charles Fellows 1901

Bridgeton.

Dare, Charles Ford 1889
Jorden, Henry Albert, Ph.G. ... 1902

Burlington.

Sparks, Edgar Reed, Ph.G. 1909

Camden.

Barrett, Charles Llewellyn 1902
Beringer, George Mahlon 1893
Beringer, George Mahlon, Jr., P.D. 1905
Weiser, William Peiffer 1902

Collingswood.

Vanderkleed, Charles Edwin ... 1902

Elizabeth.

Frohwein, Richard **1867**
Oliver, William Murray **1875**
Schmidt, Henry 1904
Stutzlen, Frank Charles 1902

NEW JERSEY.

Frenchtown.

Harman, Harry M. 1909

Hackensack.

Franck, Adolf 1909

Haddonfield.

King, James David 1910

Hoboken.

Hostmann, Jeannot 1912
Klussmann, Hermann 1876

Ironia.

Coleman, John H. 1902

Jersey City.

Diedrich, Alfred 1912
Foulke, James 1881
Gallagher, John Charles 1893
Lane, John Joseph 1909
Lohmann, Herman J. 1896

Jersey City Heights.

Bongartz, Ferdinand Alphonse .. 1905
Kuehne, Charles 1902

Kearney.

Shaak, Franklin Philip 1906

Keyport.

Warn, William Edgar 1886

Maplewood.

Byrnes, Garrett 1913

Maywood.

Balmert, Clemens Augustus, Phar.D. 1909

Medford.

Thorn, Henry Prickett, Ph.G.... 1879

Montclair.

Wrensch, Henry Ernest, Jr., Ph.G. 1902

Morristown.

Carrell, Eugene Ayres 1875

Mount Holly.

Jones, Edward B. 1909

Newark.

Bear, Pierce B. 1905
Foster, John Benjamin 1901
Hain, Frank Wm. August, Ph.G. 1905
Hart, William Frank 1912
Holzhauer, Charles 1873
Holzhauer, Charles William, A.B., Ph.G., Phar.D. 1907
Lamar, William Robinson 1901
Maltbie, Birdsey Lucius 1912
Marquier, Adolph F., Ph.G. 1909
Menk, Charles William 1898
Rusby, Henry Hurd 1890
Sawyer, Hilon H. 1911
Scholz, Oscar Robert Bruno 1909
Strauss, David 1910

New Brunswick.

Kilmer, Frederick Barnett 1886
Rust, Schuyler Scott 1905

Orange.

Behrens, John Frederick 1908
Sayre, Edward Augustus 1887

Paterson.

McNeill, William Henry 1912

Perth Amboy.

Parisen, George Warren 1892
Seaman, Frederick Anthony 1905
Seil, Harvey A. 1909

Plainfield.

Armstrong, T. S., Ph.G. 1912

Rahway.

Murray, Benjamin Lindley, Ph.C., B.S., A.M. 1896
Smith, Joseph George 1909

Red Bank.

Van Deveer, Robert Hutchison.. 1903

Salem, Ft. Matt.

Weber, Herman J. 1911

South Orange.

Feindt, Louis F. 1906

Tenafly.

Bower, Edwin Lawrence 1909

Trenton.

Randolph, R. B. F. 1911

Verona, Essex Co.

Rich, William Pitt 1902

Weehawken.

Frank, August, Ph.G. 1912

West Hoboken.

Maggio, James Innocenzo 1907
Neu, Daniel Alfred 1903
Sieker, Ferdinand August 1893
Taborelli, Ernest Thomas 1907

Westfield.

Frutchey, George Watson 1909

Woodstown.

Andrews, George 1913

NEW MEXICO.

Albuquerque.

Ruppe, Bernard Charles 1908

Fort Bayard.

Reynolds, George 1912
Wallac, Edward W. 1912

Fort Stanton.

Southard, Frank Allan, Ph.G. .. 1903

Las Vegas.

Murphey, E. G. 1909

Sante Fe.

Fischer, Adolph Jacob, Ph.G. .. 1910

Socorro.

Hilton, Emily K. (Mrs.) 1913

NEW YORK.

Albany.

Bradt, Warren Lansing 1903
Dillenbach, Garrett Van der Veer. 1902
Michaelis, Gustavus, Ph.G., Prof. Pharmacy. 1882
Taylor, Henry Lewis, A.B., A.M., Ph.D. 1906

Auburn.

Adams, Arthur Ellison 1902
Sears, Charles Barager 1906

Brooklyn.

Anderson, William Christine, Ph.G., Phar.D. 1900
Bartley, Elias Hudson 1893
Cantor, Lorentz, Ph.G. 1907
Coblentz, Virgil 1882
Creagan, William Thomas 1912
De Jonge, Cornelius 1899
Dewender, William Henry 1896
Diehl, August 1909
Diekman, Clara A. 1912
Dissosway, Thurston N., Ph.C. . 1905
Dodge, Francis Despard 1910
Duerr, George John 1910
Dunn, John Augustus 1867
Eccles, Robert Gibson, M.D. 1885
Fougera, Edmund Charles Henry. 1890
Gardner, Alexander, Ph.G. 1910
Harvey, William Arthur 1913
Hereth, Frank Samuel 1893
Holmes, Ralph Cerele 1912
Keenan, Thomas 1894
Lamb, Thomas 1911
Maines, Eugene L. 1912
Maisel, Joseph 1908
Mayo, Casswell Armstrong 1893
McElhenie, Thomas DeArmond, Ph.G. 1872
Raubenheimer, Otto, Ph.G. 1902
Riley, John Arthur 1913
Rosenzweig, Benjamin 1898
Schaak, Milton Franklin 1906
Snyder, Ambrose Chancellor .. 1867
Tocco, Orazio 1910
Tuthill, Frederick Percival, Ph.G. Phar.D. 1899
Westheimer, David 1912
Woefle, Edwin J. 1911
Wyckoff, Elmer Ellsworth 1906
Yaffa, David Benjamin 1912

Buffalo.

Bentz, Henry George 1904
Dimond, Harry John 1904
Gregory, Willis George, M.D., Ph.G. 1886
Hayes, Horace Phillips 1880
Lock, Frank E. 1910
Lockie, Peter M. 1911
McEachen, Neil 1911
Menzies, John William 1911
Reimann, George 1902
Roehrig, Albert Michael, Ph.G... 1902
Stoddart, Thomas 1900
Whelan, William Farrar 1911

Cambridge.

Richardson, Frank, Ph.G. 1906

NEW YORK.

Catskill.

DuBois, William Laneman 1880

City Island.

Alpers, Otto C. 1913

College Point.

Hartz, Johann Daniel August... 1902
Klein, Edward Nicholas Emil, Ph.C. 1905

Corning.

Cole, Victor Le Roy 1880

Dannemora.

Sloss, Robert Audley 1901

Delmar.

Huested, Alfred Birch 1879

Dunkirk.

Davis, Eugene Miller 1892

Ellis Island.

Macdowell, William Foster 1904
O'Gorman, Theophilus Vincent.. 1897

Elmira.

Holmes, Clayton Wood 1873

Flushing.

Hepburn, John 1873

Fort Terry.

Gerlach, John L. 1911

Fort H. G. Wright.

Perry, John Oliver 1912

Governor's Island.

Robertson, David, Sgt. 1st Cl. H. C., U. S. A. 1912

Hudson.

Wardle, Arthur Stanley 1910

Kingston.

McBride, Charles Luther 1910

Little Falls.

Hurley, John 1909

Middletown.

Rogers, William Henry 1869

Monticello.

Isakovics, Alois von 1905

Mount Vernon.

Nichols, J. J. 1912
Stone, Clarence George, Ph.C.. 1901

New York.

Allison, William Outis 1895
Alpers, William Charles 1890
Arny, Harry V., Ph.G., Ph.D... 1891
Ballard, Charles William, Ph.C., Phar.D., M.A. 1908
Balser, Gustavus 1875
Beilstein, Christian 1907
Berger, Louis, Ph.G. 1907
Bigelow, Clarence Otis 1900
Bilhuber, Ernst 1912
Billings, Henry M. 1869
Boeddiker, Otto 1895
Brucker, Carl Frederick Jacob .. 1902
Chandler, Charles Frederic 1867
Cohn, Alfred I. 1905
Colle, Bernard 1911
Conyngham, William Boulton .. 1909
Cosby, Charles Reynolds 1909
Craig, Hugh 1907
Cypress, Leon Lewis, Ph.G. 1912
Daggett, Volney Chapin 1901
D'Annunzio, Alfred 1912
Darling, Joshua Ferris 1909
Diekman, George Charles 1898
Diner, Jacob, Ph.G. 1906
Duff, James Charles 1910
Erhart, William Hermann 1907
Fairchild, Benjamin Thomas 1875
Fairchild, Samuel William 1887
Fankhauser, William 1913
Ferguson, George Albert, B.P... 1905
Fraser, Horatio Nelson, Ph.G., Ph.M., M.D. 1888
Gane, Eustace Harold 1895
Geisler, Joseph Frank 1889
Gregorius, Geo. Gust. Chas. Wm. 1898
Hamann, William Augustus 1907
Hatcher, Robert Anthony 1905
Haynes, David Oliphant 1887
Hays, Francis Banks 1902
Henning, Adolph 1905
Hohmann, George 1910
Holliday, Francis Emlen 1900

NEW YORK.

Hopkins, Jesse L. 1898
Hudnut, Richard Alexander ... 1899
Kalish, Oscar G., Ph.G. 1900
Kantor, Morris, Ph.G. 1912
Kantrowitz, Hugo 1907
Kemp, Edward 1903
Kennedy, Ezra Joseph **1887**
Kenney, Frederick James 1910
Kirchgasser, Wm. Charles, Ph.G. 1888
Kleinau, George 1911
Klingmann, Albert 1910
Koch, William Julius 1907
Koploditz, Barnet 1910
Lampa, Robert Raymond 1892
Lascoff, Jacob Leon 1903
Latham, Thomas 1907
Lehman, Robert Seel 1910
Leibowitch, Morris 1911
Lovis, Henry Christian 1892
Lowe, Charles Hugo 1912
Luft, George W. 1912
Main, Thomas Francis, Ph.G. ... **1872**
Major, Alphonse 1913
Mansfield, William 1907
Mayer, Joseph L. 1905
McCartney, Frank Leslie, Phar.D. 1907
McIntyre, Ewen, Jr. **1903**
McKesson, Donald, B.A. 1906
McKesson, George Clinton 1888
McKesson, John, Jr. **1867**
Metz, Herman A. 1910
Miller, James Augustus, Ph.G. .. 1912
Myerson, Isaac Aaron 1906
Nevin, Thomas 1912
Oats, Henry E. 1911
Oefele, Baron Felix von 1912
O'Neil, Henry Maurice 1879
Pierson, Romaine 1913
Plaut, Albert 1894
Quackenbush, Benjamin Franklin. 1886
Ramsey, George 1907
Riefflin, George T. 1909
Rippetoe, John Ross, P.D. 1907
Roediger, Louis Frank, Ph.G. .. 1909
Runyon, Edward Wheelock **1875**
Sahm, Louis Napoleon 1905
Scavo, John, Ph.G., Ph.C., Phar.D. 1912
Schenck, Henry 1903
Schieffelin, William Jay 1892
Schimpf, Henry William 1894
Schnell, Harry Julius 1906
Schoenfeld, Samuel, Ph.G. 1906
Schweinfurth, George Edward.. 1907
Scott, Harry 1907
Sher, Edward 1911
Skelly, James Joseph **1866**
Spring, George Alexander 1907
Stephenson, John Joseph, Ph.G.. 1905
Takamine, Jokichi 1898
Timmermann, Richard Herman.. 1909
Tucker, Thomas H. 1912
Wall, John Richland 1912
Weinstein, Joseph, P.D., Provisor Imp. Univ., Moscow, Russia. 1905
Weiss, Emil Otto 1907
Wickham, William Hull **1870**
Wimmer, Curt Paul 1907
Wooyenka, Keizo 1907

Plattsburg.

Hitchcock, John E. 1892

Queens, L. I.

Niece, Frederick Ellwood, Ph.G., Phar.D., Chem.Gd. 1903

Rochester.

Hyde, Byron M. 1908
Guilford, Harry B. 1912
Schlotterbeck, Julius O. **1888**

Salamanca.

Krieger, John Christian 1908

Saratoga Springs.

Fish, Charles F. **1866**

Sayville.

Thornhill, Sewell 1909

Sheepshead Bay.

McMahon, Joseph 1897

Springfield, L. I.

De Forest, William Pendleton .. 1879

Stapleton, Staten Island.

Becker, Ulrich William 1904
Leech, Harri Dale 1911
Stearns, William Lincoln, Ph.G.. 1903

Syracuse.

Dawson, Edward Seymour, Jr. .. 1876
Muench, William 1899
Snow, Charles Wesley 1876
Stolz, David 1911

Tottenville.

Lehman, Charles Norton 1909

Utica.

Evans, Arthur S. 1907
Slauson, John Gordon 1907
Watson, William, Jr. 1902

Watervlit Arsenal.

Griffith, George 1912

West Point.

Clifford, Henry Perry, Sgt. 1Cl. H. C., U. S. A. 1912

White Plains.

Roemer, John, O.P. 1910

Yonkers.

Petsche, Franz Friedrich Bismarck Wilhelm 1892
Schlesinger, Leopold J. 1912
Smith, William Humphrey, Ph.G. 1912

NORTH CAROLINA.

Chapel Hill.

Howell, Edward Vernon 1900

China Grove.

Swaringen, DeWitt Clinton 1905

Fayetteville.

Horne, Warren Winslow, Ph.C.. 1902

Goldsboro.

Hicks, John Elias Faison 1910

Morgantown.

Greyer, Charles Peyton 1912

Rocky Mount.

Rose, Ira Winfield, Ph.G. 1912

Tarboro.

Zoeller, Edward Victor 1876

Tryon.

Missildine, Ernest Ellwood, A.B. 1910

Washington.

Feild, David Meade 1912

Wilmington.

Hardin, John Hapwood 1881

Wilson.

Tarkenton, Edward Lawrence .. 1912

NORTH DAKOTA.

Abercrombie.

Ware, Clarence Walter 1907

Bismarck.

Finney, Burt 1909
Moore, Francis 1912

Fargo.

Bentson, Bernard Leo 1909
Hallenburg, Oscar 1909
Porterfield, Wm. Perry, Ph.G. .. 1909
Ziefle, Adolph 1910

Grafton.

Haussamen, Henry Louis, Ph.G. 1906

Lisbon.

Parker, William Stillman 1909

Minot.

Bromme, Wm. Louis, Ph.G., R.P. 1907

Willow City.

Master, Walter 1909

OHIO.

Ada.

Mohler, David Christian, Ph.G., Ph.L. 1906

Akron.

Davis, Ernest C., Ph.C. 1913
Dutt, William 1905

Arcanum.

Hoffmann, Charles O. 1913

Barnesville.

Ely, Ernest Sykes 1904

Bellevue.

Brinker, John Henry 1906

Bluffton.

Hauenstein, Sidney 1913

OHIO.

Cambridge.

Schlup, Samuel, Jr. 1908

Canton.

Hannon, Owen Burdette 1893
Portmann, Leo Edward 1912
Roth, Charles Robert 1900
Schlabach, Edward John 1904
Shanafelt, Fred P., Ph.C. 1909
Stanbarger, Morris Howard ... 1906

Chillicothe.

Howson, Arthur Bagshawe 1886

Cincinnati.

Apmeyer, Charles Ascau 1906
Ehlers, Charles 1912
Fennel, Charles Theodore Piderit, Ph.G., Phar.D. 1886
Freericks, Frank Herman, Ph.G., LL.B. 1905
Gansz, William Henry 1905
Greyer, Julius 1880
Katz, Otto 1904
Kutchbauch, John Frederick, Ph.G. 1904
Lloyd, John Uri 1870
Merrell, Charles George, S.B... 1888
Merrell, George 1897
Thiesing, Edward Henry 1912
Voss, Edward, Jr. 1904
Wetterstroem, Theodore David, Ph.G. 1897
Yorston, Matthew Mackay 1864
Zuenkeler, John Ferdinand, Ph.G. 1887
Zwick, Albert Otto 1912

Circleville.

Fickhardt, Frederick Lutz 1904

Cleveland.

Benfield, Charles William 1893
Cobb, Ralph Lathrop 1883
Coleman, Glenn Forrest 1909
Feil, Joseph 1885
Fischer, Henry John 1902
Flandermeyer, August Louis, Ph.G. 1910
Fox, Williard Milton 1903
Hankey, William Tabor 1902
Hechler, Edward Henry 1904
Hopp, Lewis Christopher 1876
Maguire, Edward Sylvester, Ph.G. 1897
Miller, Frederick John 1902
Muhlhan, Otto Emil 1905
Placak, Harry, Ph.G. 1902
Reed, James Garfield 1909
Schellentrager, Ernest August .. 1906
Schoenhut, Christian Henry 1888
Selzer, Eugene Reinhold, Ph.C.. 1893
Sherwood, Henry Jackson 1894
Sollmann, Torald 1908
Sords, Thomas Vincent 1893
Tanner, Thomas Bernard 1912
Treadon, Walter J. 1913
Winter, Carl 1910
Woolsey, Jesse Francis 1910

Columbus.

Ackerman, Philip Jacob 1906
Bagley, Anna Gertrude 1912
Baigent, John, Sergt. 1st Cl. H. C., U. S. A. 1911
Dahl, Marius 1912
Dye, Clair Albert 1901
Folk, Levi Everett 1911
Ford, Myron Nile 1912
Franklin, Peter P. 1912
Harp, Lewis D., Sergt. H. C., U. S. A. 1911
Hatton, Ellmore Wright 1894
Herpich, John Le Dure 1906
Kaemmerer, William Frederick . 1899
Kauffman, George Beecher 1882
Kiler, Abdel William 1908
Koelle, Ernest A. 1912
McClure, Fred H. 1912
Oole, Edward, Sgt. 1st Cl. H. C., U. S. A. 1912
Sauerbrun, Otto Orville 1905
Schueller, Frederick William .. 1880
Spease, Edward, B.Sc., Ph.C. .. 1912
Topping, George Ballard, Ph.C... 1913
Webb, Edward Nathan 1905
Wendt, William Carl 1901

East Liverpool.

Benedum, Ralph C. 1913
Holloway, Jesse Garfield, Ph.C.. 1905

Elyria.

Craine, Percy P. 1908

Grand Rapids, Woods Co.

Thurston, Azor 1886

Logan.

Harrington, Frank 1869

Mansfield.

Ashbrook, Charles Shaw 1910

Nelsonville.

Marsh, Frederick Albert 1912

Norwalk.

Harter, Otto M. 1912

Pomeroy.

Reed, Curtis Darius 1913

Sandusky.

Biehl, Lewis A. 1908

Scio.

Beal, James Hartley 1892
Starkey, Harley Dale 1913

Sebring.

Bandy, Lewis Abram 1908

Sidney.

Christian, F. D. 1913

Springfield.

Siegenthaler, Harvey Newton .. 1882

Toledo.

Bowman, Waldo Moffett 1905
Ludwig, William Edward 1904
Rieser, George Frederick, Ph.G.. 1913

Troy.

Tobey, Charles William, Ph.G.. 1909

Twinsburg.

Stingel, Jacob Leroy 1909

Waynesville.

Strawn, May E., Ph.C. 1912

Youngstown.

Cassaday, Orlin Ulysses 1899
Ohl, Jay Denham 1909

OKLAHOMA.

Atoka.

Lewis, Theodore Cuyler 1911

Caddo.

Dodd, William F. 1909

Checotah.

Kniseley, Herman Dee 1905

Durant.

Schenck, Fannie Kennedy (Mrs.) 1906

Ft. Sill.

Sharman, Herbert, Sergt. 1st Cl. H. C., U. S. A. 1913

Guthrie.

Lillie Foress Ball 1900

Hennessey.

Dinkler, Frank Adam 1900

Luther.

McCutchen, William Henry, Ph.C. 1913

Norman.

De Barr, Edwin 1905

Pond Creek.

Dow, Charles Asher 1909

Shawnee.

Machenheimer, Don Grover, Ph.G. 1906

Stroud.

Burton, John Clement 1902

OREGON.

Corvallis.

McKellips, Clarence 1909

Grants Pass.

Slover, James Anderson 1909

Klamath Falls.

Reum, Arthur William 1910

Marshfield.

Brown, James Lee, Ph.G. 1903

North Bend.

Everitt, Miles Ellsworth 1909

Pendleton.

Brown, Oscar 1912

Portland.

Byerley, Fabian 1909
Clarke, Louis Gaylord 1909
Crysler, Ralph 1909
Gradon, Walter Allen 1909
Haack, Ludolph George 1909
Koehler, William Francis 1909
Lane, John Max Alfred 1904
McMillan, Daniel Newcomb, Ph.G. 1909

Miller, Wm. Louis, Ph.G. 1910
Rein, Tania 1910
Robertson, Felix Otey 1890

Salem.

Harbord, Kittie Walker, Phar.D. 1905

Silverton.

Johnson, Lewis 1909

The Dalles.

Blakeley, George Clarence 1892
Patterson, Raleigh Blaine 1912

PENNSYLVANIA.

Alleghany City.

Sample, Oliver Hazen 1907

Altoona.

Hughes, Clyde Francis 1913

Ashland.

Martz, Samuel Geo. Washington. 1911

Ambridge.

Freymark, Geo. Fred. 1913

Bellwood.

Grauer, Norman Albert 1909

Brackenridge.

Chapman, Joseph T. 1910

Braddock.

Bumbera, Joseph H. 1913
Czyzewski, Blasius Joseph 1906
Kutscher, George William 1905
Reichert, Louis, Jr., ... 1911

Bryn Mawr.

Winslow, Edward Fayssoux 1910

Butler.

Wagner, Gebhard B. 1912

Canonsburg.

Morron, George Shattuck 1905

Carlisle.

Horn, Wilbur Fisk 1876

Carrick.

McNulty, James Cleland 1909

Castle Shannon.

Doyle, Joseph Jesse 1909

Columbia.

Zeamer, John George 1906

Conemaugh.

Robak, William Nicholas, Ph.G. 1912

Crafton.

Kossler, Albert Lawrence 1911

Curwensville.

Kirk, Frank Hall 1907

Du Bois.

Hay, Charles La Mar 1898
Herron, Charles Selburn 1911
Simmons, Joseph A. 1913

Duquesne.

Kovacs, Samuel Solomon 1912
Pietkiewicz, Wladyslaw Lion... 1908

East Downington.

Tyson, Jesse Scholl 1913

Easton.

Anspach, Paul Bucher, Ph.G. ... 1903

Ebensburg.

Davis, Elden Barker 1913

Eddystone, Delaware Co.

Morris, Lemuel Ioworth 1880

Elkins Park.

Osborne, Melmoth Mercer 1906

Emporium.

French, Fred A. 1911

Ford City.

Rihn, Edward John 1913

Greencastle.

Carl, Charles Blair 1910

Greensburg.

Campbell, Andrew 1909

Grove City.

DeFrance, George W. 1910

Harrisburg.

George, Charles Theodore 1873
Gorgas, George Albert 1884
Kramer, Charles F. 1910
Smith, Benjamin Franklin 1892

PENNSYLVANIA.

Hatboro.

Rothwell, Walter 1907

Haverford.

Harbaugh, Wilson Linn 1896

Homestead.

Smetana, Andy Joseph 1909
Wohlfarth, Walter Francis 1913

Houtzdale.

Arnold, William Charles 1908

Indiana.

Houck, David Lee 1909

Johnstown.

Griffith, Charles 1900

Kingston.

Lohmann, John 1904
Pegg, Harry Wilson, Ph.G. 1908

Lancaster.

Frailey, William Otterbein 1903

Lebanon.

Lemberger, Joseph Lyon, Ph.G., Ph.M. **1858**

Lock Haven.

Heffner, Edgar F. 1911

Manheim, Lancaster Co.

Ruhl, Harry Fry 1902

McKeesport.

Miller, Lawrence John, Ph.G. .. 1913

McKees Rocks.

Sandles, Van Amburg 1909

Meadville.

Utech, Philip Henry, Ph.G. 1907

New Castle.

Wallace, John Crawford, Phar.D. 1905

Norristown.

Reed, Willoughby Henry 1893
Worthington, John Warren Wolfe. 1912

Norwood.

Borneman, John A. 1912

Ogontz.

Clayton, Abram Theophilus 1906

Oil City.

Gaddes, John 1911

Philadelphia.

Alacan, Jose P., Phar.D. 1907
Apple, Franklin Muhlenberg, Ph.G., Phar.D. 1905
Baer, Jacob Michael 1902
Blackwood, Russell Thorn 1907
Blair, Henry Cowan 1907
Borell, Henry Augustus, Ph.G. **1874**
Boring, Edwin McCurdy **1867**
Brinton, Clement Starr 1907
Busch, Henry Paul 1910
Busch, Miers 1903
Cadmus, Robert Clark 1906
Campbell, Milton 1902
Campbell, Theodore 1902
Carpenter, William Asbury 1910
Clapham, Hesser Charles 1907
Cliffe, William Lincoln 1898
Conover, Samuel Harry 1908
Cook, Ernest Fullerton, P.D.... 1901
Cope, Frank Henry 1909
Cuthbert, Richard William 1906
Decker, Robert William 1907
Ellis, Evan Tyson 1857
England, Joseph Winters 1893
Evans, George Bryan 1902
Fischelis, Robert Phillip, Ph.G., Ph.C., B.Sc. 1911
Fox, Peter Paul **1869**
French, Harry Banks 1890
French, Howard Barclay 1906
Gabell, Cromwell Pearce, Ph.G.. 1907
Gano, William Hubbell, Ph.G... 1892
Garvey, James Aloysius, P.D. .. 1909
Githens, Thomas Stotesbury 1909
Gordon, Frederick Troup, B.S., Ph.C. 1911
Graham, Willard 1902
Gutzeit, Charles S. 1912
Hance, Anthony Miskey 1902
Hance, Edward Hance **1857**
Harbold, Curtis Alexander 1907
Hassinger, Samuel Ellphat Reed. 1880
Haussmann, Frederick William.. 1895
Haydock, Susannah Garrigues .. 1905
Heim, William Joseph 1902
Heinzelman, Joseph Augustus .. 1858
Henry, Samuel Clements 1909

PENNSYLVANIA.

Hoch, Quintus 1907
Hughes, Francis Stacker 1902
Hunsberger, Ambrose 1905
Kahn, Solomon Karl 1905
Kercher, Edwin Harry, Ph.G. .. 1907
Kimberly, Charles Hubbell, B.Sc., M.Sc., Phar.D., Ph.D. 1908
Kirby, Charles P. 1909
Kirk, Samuel Bird 1907
Kline, Clarence Mahlon, Ph.B... 1902
Koch, Christopher, Jr., Ph.G.... 1907
Kraemer, Henry 1892
Lacey, William Henry 1907
Lackey, Richard Henry 1907
Lantz, William Henry 1908
LaWall, Charles Herbert, Ph.M. 1896
LaWall, Millicent Renshaw (Mrs.) P.D. 1905
Lee, William Estell, Ph.G. 1905
Leedom, Charles 1902
Lowe, Clement Belton, Ph.B., Ph.G., M.D. 1895
Matusow, Harry, Ph.G. 1897
McNeil, Robert 1907
Meeker, George Herbert, B.S., M.S., Ph.D., Phar.D., D.D.S., LL.D. 1905
Mellor, Alfred 1864
Miller, Adolphus William, Ph.G., M.A., Ph.D. 1868
Minehart, John Roy 1905
Moerk, Frank Xavier, Ph.G., Ph.M. 1898
Morgan, Frank E., Ph.G., Phar.D. 1906
Nebig, William George, Ph.G... 1907
Osterlund, Otto William 1902
Ottinger, James Jerimiah 1876
Pachali, Theodore, Jr. 1907
Peacock, Bertha Leon (Mrs.) Ph.G. 1895
Peacock, Josiah Comegys, Ph.G. 1892
Pearson, William Alexander ... 1908
Pfeiffer, Gustavus Adolphus 1910
Pittinger, Paul Stewart, Ph.G., Ph.C., Phar.D. 1911
Poley, Warren Henry 1906
Pollard, August Torrey 1906
Rehfuss, Charles 1908
Remington, Joseph Price 1867
Rider, Joseph A. 1911
Roessner, Benjamin, Phar.D. ... 1912
Rosengarten, George David 1902
Sadtler, Samuel Philip 1893
Seidman, Harry 1911
Shafer, Erwin Clement 1893
Shoemaker, Clayton French 1902
Shoemaker, Richard Martin 1865
Siegfried, Howard J. 1907
Simpson, Robert 1912
Smith, Howard E. 1910
Smith, Walter Valentine 1902
Stanislaus, Ignatius Valerius Stanley 1906
Staudt, Albert John 1907
Stewart, Francis Edward 1884
Streeper, Frank Park 1907
Stroup, Freeman Preston, Ph.M. 1900
Sturmer, Julius William, Ph.G., Phar.D. 1901
Thum, John Karl, Ph.G. 1905
Weidmann, Charles Alexander, Ph.G., M.D. 1868
Weidmann, George Buzby 1902
Weisner, Nicholas Frederick ... 1909
White, Robert Walter, Ph.G. .. 1911
Wood, Horatio C., Jr., M.D. 1906
Youngken, Heber Wilkinson, A.B., A.M., Ph.G. 1912

Pittsburgh.

Alvino, Ernest Eugenio 1910
Bell, John Michael 1908
Blank, Herman Gustave 1905
Blumenschein, Frederick John .. 1904
Brackmann, Albert 1912
Calhoun, Will M. 1908
Darbaker, Leasure Kline, Ph.G., Phar.D. 1909
Emanuel, Louis 1878
Erskine, George Walker 1909
Judd, Albert Floyd 1901
Koch, Julius A. 1892
Kossler, Herman Stanislaus 1905
Kretz, Edward John 1909
Kuenzig, Peter A. 1913
Lohmeyer, Henry L. 1910
McMonigle, David Ralph 1913
Mierzwa, Richard 1908
Minor, Harry S. 1909
O'Brien, James Stanley 1912
Pritchard, Benjamin Elliott 1908
Robin, David Nathaniel, Ph.G... 1910

Rodemoyer, William Edward ... 1901
Saalbach, Carl, Ph.G. 1908
Saalbach, Louis, Ph.G., Phar.D.. 1907
Schaefer, Charles Henry, Ph.G. 1909
Schaefer, Emil August, Phar.D.. 1900
Sims, James Clothier 1912
Stiefel, Albert Frederick 1909
Szykowny, Thomas Joseph 1912
Thompson, John Reynolds 1905
Walley, Charles Elmer 1912
Walter, Peter Grant, Ph.G., Phar.D. 1905
Wurdach, John Herman 1909
Young, Harry Garfield 1913

Plains.

Merritt, Henry W. 1912

Pottsville.

Deibert, Thomas Irwin 1882

Prospect.

Soult, Roy M. 1905

Quarryville.

Shaub, Jacob Raymond 1908

Reading.

Ziegler, Howard Philip 1905
Ziegler, Philip Milton **1867**

Rosemont.

Egan, Thomas 1911

Scranton.

Knoepfel, William Henry 1909

Sewickley.

Minesinger, Norman Wilhelm .. 1906

South Sharon.

Kress, Samuel 1907

Towanda.

Porter, Henry Carroll **1872**

Washington.

McConaughy, Thomas Singleton. 1905
Vowell, Louis Sweitzer 1905

Wayne.

Mulford, Henry Kendall 1896

Waynesburg.

Gleghorn, James Seymour 1900
McGovern, John Francis, Ph.G., P.D. 1906

Wilkinsburg.

Wambaugh, Charles Raymond .. 1913

Williamsport.

Cornell, Edward Augustus, Ph.G. **1873**
Milliner, William S. 1905
Walton, Lucius Leedom, Ph.G., Ph.M., Phar.D. 1904

Woodlawn.

Bryson, William Smith 1905

York.

Harbold, John Tilden 1905
Leber, Jacob Gilbert 1905
Patton, John Franklin 1880

PHILIPPINE ISLANDS.

Albay.

Thomas, William H., Sgt. 1st Cl. H. C., U. S. A. 1912

Batangas.

Cook, Samuel, Sgt. 1st Cl. H. C., U. S. A. 1912
Dendy, Joseph Young, Sgt. 1st Cl. H. C., U. S. A. 1912
Ferguson, Edward William, Sgt. 1st Cl. H. C., U. S. A. 1912
Hicks, George William 1912
Luhman, Fred 1912
Shiffer, Walter Edwin 1912

Bayambang.

Sires, Edward B. 1913

Benguet.

Goosey, Gilbert H. 1913

Cavite.

Reiter, Harry L., Sgt. 1st Cl. H. C., U. S. A. 1911

Davao, Mind.

McEnroe, Robert L., Sgt. 1st Cl. H. C., U. S. A. 1912

PHILIPPINE ISLANDS.

Ft. Wm. McKinley.

Arias, Ernest, Sgt. 1st Cl. H. C., U. S. A. 1913
Barker, Quentin Johnstone 1912
Douglas, Robert James, Sgt. 1st Cl. H. C., U. S. A. 1912
Eisenman, Francis Joseph, Sgt. 1st Cl. H. C., U. S. A. 1912
Frankau, Gust, Sgt. 1st Cl. H. C., U. S. A. 1912
Hogan, Michael John, Sgt. 1st Cl. H. C., U. S. A. 1912
Shaw, Charles Noel, Sgt. 1st Cl. H. C., U. S. A. 1912

Corregidor.

Goodman, David, Sgt. 1st Cl. H. C., U. S. A. 1913
Hitz, Michael, Sgt. 1st Cl. H. C., U. S. A. 1913
Jeen, Elmer, Sgt. 1st Cl. H. C., U. S. A. 1913
Jole, Adolph, Sgt. 1st Cl. H. C., U. S. A. 1913
Stahl, Joseph, Sgt. 1st Cl. H. C., U. S. A. 1913

Grande Island.

Casmussen, Nels 1911
Fonteyne, Gustave J. 1912

Guimaras.

Harris, Samuel J. 1912
Parker, Hiram Carney 1912
Williams, Frederick R. 1911

Iloilo, Panay.

Doran, George Clayton 1912
Montgomery, Moses 1913

Jolo.

Benche, Carl S. 1913
Cook, Harry 1913
Grose, James William 1913
Neville, Arthur 1911

Laguna.

Knapp, Gustave 1912
La Grindeur, Romanus A., Sgt. 1st Cl. H. C., U. S. A. 1912

Legaspi.

Leonard, John Francis, Sgt. 1st Cl. H. C., U. S. A. 1913

Manila.

Barclay, James Martin 1913
Behre, John Rufus, Sgt. 1st C. H. C., U. S. A. 1912
Begley, Henry L., Sgt. 1st Cl. H. C., U. S. A. 1913
Brown, Arthur E., Sgt. 1st Cl. H. C., U. S. A. 1911
Byers, Jason David, Sgt. 1st Cl. H. C., U. S. A. 1912
Clark, Amos Wilson, Sgt. 1st Cl. H. C., U. S. A. 1913
Comfort, Newton C., Sgt. 1st Cl. H. C., U. S. A. 1904
Douglass, George Caldwell 1912
Freeman, Aaron, Sgt. 1st Cl. H. C., U. S. A. 1912
Gallagher, Charles, Sgt. 1st Cl. H. C., U. S. A. 1912
Gavagan, Edward Daniel, Sgt. 1st Cl. H. C., U. S. A. 1912
Greene, Earl F., Sgt. 1st Cl. H. C., U. S. A. 1913
Guerrero, Leon M. 1912
Hahn, Gustave, Sgt. 1st Cl. H. C., U. S. A. 1912
Hansen, Mathew K., Sgt. 1st Cl. H. C., U. S. A. 1911
Hitch, Edgar Thomas 1912
Lovelly, Edward A., Jr., Sgt. 1st Cl. H. C., U. S. A. 1911
Merryman, James R., Sgt. 1st Cl. H. C., U. S. A. 1913
Murphy, William Joseph 1913
Newman, Emanuel, Sgt. 1st Cl. H. C., U. S. A. 1913
Phillips, Ira Brooks, Sgt. 1st Cl. H. C., U. S. A. 1912
Seith, Louis F., Sgt. 1st Cl. H. C., U. S. A. 1912
Senecal, Henry C. 1911
Smelsey, Samuel, Sgt, 1st Cl. H. C., U. S. A. 1913
Soekland, William Godfrey, Sgt. 1st Cl. H. C., U. S. A. 1912
Westra, Ray, Sgt. 1st Cl. H. C., U. S. A. 1912

Young, Charles Cooper, Sgt. 1st Cl. H. C., U. S. A., ... 1912
Zamora, Manuel, Sgt. 1st Cl. H. C., U. S. A. 1908

Mindanao.

Eble, C. F. 1911
Frese, Otto Frederick 1912
Paul, George Harrison, Sgt. 1st Cl. H. C., U. S. A. 1911

Pampanga.

Robinson, Dan Wilson 1912

Samar, Camp Connell.

Riesenberg, Max 1912

Torrey Barracks.

Holt, Frank, Sgt. 1st Cl. H. C., U. S. A. 1911

RHODE ISLAND.

Fort Greble.

Brower, Thomas E. 1912

Narragansett Pier.

Davis, Peter Bernard 1909

Newport.

Downing, Benjamin Franklin .. 1886
Wood, John William 1897
Wright, James Tytler 1910

Pawtucket.

Brennan, James Edward 1909
Johnson, Alfred J., Jr. 1911
Morgan, George Smith 1909

Providence.

Anthony, Edwin Perkins 1909
Blanding, William Oliver 1894
Blumenkranz, Emil Simon 1911
Bowmer, Clarence 1911
Colton, Edward Thomas 1909
Corrigan, Michael H. 1913
Fairbanks, Geo. Edwin Barrows. 1909
Haynes, Herbert 1908
O'Hare, James, Phar.D. 1888
Parker, Gilbert Ritchie 1910
Pearce, Howard Anthony 1894
Reiner, Nicholas F. 1913
Strickland, Franklin Nelson 1905

SOUTH CAROLINA.

Anderson.

Evans, George William 1912

Charleston.

Hyde, Joseph Bell, Jr., Ph.G.... 1909
Plenge, Henry 1910

SOUTH DAKOTA.

Aberdeen.

Woodward, Albert Alvin 1910

Ashton.

Olson, Frederick 1911

Beresford.

Bruehler, George J. 1910
Kriebs, Frank Delbert, Ph.G. .. 1910

Bowdle.

Maas, Henry Conrad 1910

Brookings.

Whitehead, Bower Thomas 1908

Centerville.

Heisler, John Emery 1910

Conde.

Goldthorpe, George Alexander .. 1910
Ross, Otto Ellsworth, Ph.C. 1908

Crocker.

Koelle, Otto Charles 1902

Dell Rapids.

Bent, Edward Clarence 1905

Estelline.

Hoffelt, Edward 1910

Garden City.

Wagner, Josiah Feller 1912

Houghton.

Hughes, John Richard 1910

Huron.

Holstrom, William A. 1912

Langford.

Cook, Harry Lawrence 1912

Lead.

Brown, Floyd Woodford 1910

Mitchell.

Scallin, Stephen Harmon 1910

Mt. Vernon.

Hiner, Virgil 1910
Shirmer, S. F. 1910

Redfield.

Swartz, George Fisher 1909

Sioux Falls.

Bernhart, Peter Kristoffer, Ph.G. 1910
Dunning, Lyman Taylor 1906

Sturgis.

Williams, Arthur Reynolds 1910

Tyndall.

Cotton, Robert M. 1912

Vermillion.

Cook, Alfred 1913

Watertown.

Jones, David Franklin, Ph.G. ... 1895
Zieske, Arthur, Ph.G. 1910

TENNESSEE.

Bolivar.

Cook, Charles Samuel 1912

Chattanooga.

Voight, Joseph Frederick 1893

Columbia.

Smith, Richard, Ph.C. 1910

Delherd.

Bass, Francis Marion 1912

Elora.

Walker, Elias Russell, Ph.G. ... 1900

Knoxville.

Rosenthal, David Abraham, Ph.G. 1894

Memphis.

Mayo, Frederick William 1909
Robinson, James Scott **1869**
Ward, Francis Watson 1908

Nashville.

Aicklen, Henry, Sgt. 1st Cl. H. C., U. S. A. 1912
Bloomstein, Max 1910
Burge, James Oscar, Ph.G. **1878**
Clark, Ira Berton 1909
Cook, Moses 1910
Eves, Robert Lee 1909
Hubbard, Geo. Whipple 1912
Hutton, Major Ernest 1910
Kemper, Earl 1911
Martin, Andrew Joseph 1910
McDaniel, John Rogers 1911
McGill, John Thomas 1900
Moore, Stephen William 1910
Pully, Luther Smith 1910
Ruddiman, Edsel Alexander, Ph.C., Phar.M., M.D. 1894
Sand, Jerome Bonapart 1910
Smith, Frank Leslie 1910
Waldrum, Jonas Young 1912
White, William Rufus, Ph.G. .. 1904
Young, Clarence Coery 1910

Newbern.

Westbrook, Charles Gray 1912

Sharon.

Shannon, Thomas J. 1905

Waverly.

Finch, Ernest C. 1913

Whiteville.

Gates, William Irby 1912

TEXAS.

Austin.

Jackson, Hugh Cyrus 1909

Bomarton.

Seydler, Robert 1910

Brownsville.

Willman, William George 1904

Celina.

Willis, Roland Merriman 1910

Corsicana.

Coulson, James Thomas 1906

Dallas.

Anderson, Oscar L. 1911
De Lorenzi, Albert 1890
Duncan, Chester Arthur, B.S., P.C., P.D. 1906

TEXAS.

Eberle, Eugene Gustavus, Ph.G., A.M. 1896
Green, Bertram Eugene 1911
Hawkins, Tom W. 1912
Jelton, Louis McKnight 1910
Kelton, Will W. 1911
Medlock, Charles Thomas 1911
Mitchel, Lloyd Benjamin 1912
Rogers, Cecil Val 1912
Schrodt, Jacob, Ph.G., Prof. 1903
Vinal, George 1911

El Paso.

Ryan, Ambrose Eugene 1907
Weaber, John Alvin 1906

Encinal.

Guerrero, Juan Cantu 1911

Forney.

Adams, Walter Dickson 1913

Fort Bliss.

Elrook, William W. 1911
Todd, James Howard 1911

Fort Crockett.

Stevenson, Ephraim Pennington, Sergt. 1st Cl. H. C., U. S. A. .. 1911

Fort Worth.

Brashear, James Preston 1909
Coulson, Jack 1909
Covey, John Walker 1908
Needham, Robert Hamilton 1906
Robbins, Kenneth Cambus 1913
Smith, Renna Mae 1912

Galveston.

Buckner, John Clark 1905
Cline, Raoul Rene Daniel, B.A., B.S., A.M., Ph.G., M.D. 1898
Koester, Hermann 1910
Orton, Ingomar Francis 1891

Gonzales.

Mohrmann, John Max 1912
Robertson, William Franklin .. 1907
Walker, Robert Hamilton, B.S., Ph.M., ... 1907

Halletsville.

Saccar, Michael, Ph.G. 1905

Houston.

Burgheim, Jacob 1892
Jones, Randal J. W. 1912
Kiesling, Adolph Ernest 1910

Laredo.

Daily, Joseph 1911

Lockhart.

Westmoreland, Edwin Reese, Ph.G. 1910

Lovelady.

Lawrence, King David 1911

Lubbock.

Duering, Henry Charles 1901

McKinney.

Dulaney, Joseph Field, P.D. 1902

New Braunfels.

Schumann, Henry Valentine ... 1911

Refugio.

Clarkson, E. D. 1913

Rule.

Watson, Elisha Thomas 1912

San Antonio.

Dreiss, Hermann E. F., Ph.G. .. 1912
Nester, Herman August, Ph.G. . 1909
Schaefer, Laura 1909
Smith, William L. 1912

San Saba.

Gosch, Clarence G. 1910

Taylor.

Carleton, Henry Lincoln 1910

Waco.

Morrison, Wade B. 1911

Waelder, Gonsales Co.

Brookes, Virginia Cade 1901

Winters.

Tucker, George Roscoe 1911

Yoakum.

Koerth, Emil Christian 1910

Yorktown.

Bomba, Onufry Joseph 1910

UTAH.

Brigham.

Eddy, Wynn Leland 1908

Cedar City.

Bladen, John Mount 1908

Fort Douglas.

Curtis, Herbert, Sgt. 1st Cl. H. C., U. S. A. 1911

Logan.

Riter, Benjamin Franklin 1910

Milford.

Misch, Edward Frederick 1910

Ogden.

Culley, John, Ph.G. 1908

Salt Lake City.

Dayton, Walter Henry, Ph.G. .. 1908
Holliday, Thomas Law 1908
Harms, Herman E. 1908
Nelden, Ralph 1908
Schramm, Frederick Clement .. 1908
Van Dyke, Charles 1908
Whitworth, Frank Edgar 1908

VERMONT.

Barre.

Davis, Daniel Frost 1907

Barton.

Pierce, Fred Dutton 1909

Bradford.

Taylor, John Melvin 1912

Brattleboro.

Root, Wilfred F. 1912

Burlington.

Beebe, Mason Gaylord 1913
Zottman, William Henry 1903

Marshfield.

Gilman, Elbridge Wheeler 1907

Montpelier.

Slade, Henry Allen 1890

Morrisville.

Cheney, Arthur Lewis 1907

N. Ferrisburg.

Claflin, Walter Addison 1896

Orleans.

Austin, Arthur Orlo, Pharm.D.. 1909

Rutland.

McClallen, E. Gregory 1912
Trudel, Lucien Joseph 1910

St. Johnsbury.

Bingham, Charles Calvin 1875
Eastman, Welcome B. 1912

Virgennes.

Neville, Timothy 1912

VIRGINIA.

Charlotte C. H.

Williams, Walter G. 1913

Culpeper.

Goldsborough, Charles Henry .. 1898

Falls Church.

Mankin, George Tyres 1909

Fort Hunt.

Person, Thomas 1911

Fort Meyer.

Ellingen, Emil, Sgt. 1st Cl. H. C., U. S. A. 1911
Weir, Samuel A. 1911

Harrisonburg.

Avis, James Little 1905

Lynchburg.

Fleet, Charles B. 1909
Hamner, Edward Chambers 1909

Martinsville.

Kearfoot, Clarence Piercall 1908

Norfolk.

Nelligar, Frederic Dennis 1907
Taylor, Thomas Ramsay 1913

Peterburg.

Knock, Thomas Franklin 1911

Phoebus.

Congdon, George Gardner 1903

Richmond.

Bolenbaugh, Albert 1909
Booker, Robert L. 1910
Brandis, Ernest Linwood 1906
Briggs, Andrew Gessner 1890
Curd, Thomas Nelson 1907
Ford, Lacy Thornton 1910
Johann, Adam Ernest 1910
Miller, Roshier W. 1906
Miller, Turner Ashby, Ph.G. ... 1894
Taylor, Edgar Darby 1910

Roanoke.

Barnes, Henry Cooper 1905
Fox, Charles Dunsmore 1913

Suffolk.

Hall, Joseph Patten 1900

Tazewell.

Jackson, John E. 1913

WASHINGTON.

Bremerton.

Veldee, Milton V., Ph.C. 1912

Connell.

Garrison, Dayton Burt, Ph.G.... 1913

Everett.

Conner, Ray Bradford, Ph.C... 1912

Fort Casey.

Kroger, Harry Albert Richard.. 1912

Fort Flager.

Schulz, Emil, Sergt. 1st Cl. H. C., U. S. A. 1913

La Conner, Skagit Co.

Joergensen, Sophus 1889

Pullman.

Watt, George Henry 1896

Puyallup.

Truedson, Eric Per 1904

Sauk.

Ralya, Earl Clare 1912

Seattle.

Ball, Alice Augusta, Ph.C. 1912
Bartley, Deance C. 1910
Blalock, Jesse Nelson 1909
Brown, Burton Augustus 1910
Closson, John Henry 1912
Coats, Zoe (Miss) 1913
Dewey, Albert Haskin 1909
Gilbertson, Louis Steven 1912
Gilluly, Frank 1912
Herman, H. E. 1912
Holmes, Henry Elliott 1880
Johnson, Charles Willis, Ph.C., B.S., Ph.D. 1903
Kinsel, Edward Charles 1912
Lee, James 1913
McLean, James W. 1911
McTague, Edward Joseph 1913
Osseward, Cornelius, Ph.C. 1897
Rubenstein, Louis 1909
Siegal, Harry Jacob 1912
Thompson, Peter 1912
Watson, Joseph Ryerson, Ph.C.. 1904

Snohomish.

Wilbur, Lot 1896

Spokane.

Clizer, William Arthur 1913
Ferte, Emil P. 1913
Maxwell, Asa Frank 1912
Murphy, Barry Franklyn 1913

Tacoma.

Kent, Nick Gardner 1909
Sivear, Fred George, Ph.C. 1912

Tenino.

Battista, Angelus Andrew 1913

Wilbur.

Bandy, George, Ph.G. 1905

WEST VIRGINIA.

Bluefield.

Goodykoontz, Charles Henry ... 1909

Buckhannon.

Young, George Orvill 1907

Charleston.

Price, Walter C. 1910

Clarksburg.

Haymaker, Frank Berkshire ... 1906

Glenville.

Tierney, James Aloysius 1910

Harper's Ferry.

Dittmeyer, Walter Eugene, P.D. 1907

Hinton.

Rose, Shannon Samuel 1909

Martinsburg.

Brown, Edward Preston 1906

Pine Grove.

Morgan, Thomas Lee 1907

Sutton.

Walker, Alfred 1905

Welch.

Downs, Bertis E. 1913

Wheeling.

Coleman, John 1905

WISCONSIN.

Beaver Dam.

Herrick, William Albert 1911

Crandon.

Netzel, Arthur Frank 1911

Eau Claire.

Boberg, Otto Johan Sinius 1903

Fond du Lac.

Kremer, Berthold James 1913

Jefferson.

Fischer, Ray Otto 1911

La Crosse.

Beyschlag, Charles 1880
Hebbard, Edward Smith 1907

Madison.

Fischer, Richard, Ph.D. 1901
Keim, Charles Adam 1913
Kremers, Edward, Ph.G., Ph.D. 1887
Langenhan, Henry August 1908
Lewis, Henry 1908
Williams, Edward 1906

Menomonie.

Puhl, Richard Herman 1908

Milwaukee.

Dadd, Robert Morrow 1896
Eckstein, Sollman A. 1912
Graw, Paul 1912
Haertlein, George Henry 1910
Kemp, Fred W. 1912
Kettler, Edward, Jr. 1896
Krembs, Ernest Maxmilian 1903
Raeuber, Edward Gottfried, Ph.G. 1900
Ruenzel, Henry Gottlied 1892
Schrank, Charles Henry 1876
Sommer, Richard Ernest Wilhelm. 1909
Spiegel, Adolph 1905
Urban, Leopold Charles 1912

Niellsville.

Sniteman, Charles Clarence 1881

Oconomowoc.

Peters, Henry August 1903

Racine.

Horlick, Alexander James 1904
Kradwell, Gustav A. 1908
Mueller, Frank Frederick 1909

Thiensville.

Seyfert, Paul 1909

Watertown.

Eberle, Arthur Ralph, Ph.G. ... 1907
Eberle, Herman Theodore 1901

Wausau.

Albers, William W. 1909

WYOMING.

Ft. D. A. Russell (Cheyenne).

Bjork, Neils J., Sgt. 1st Cl. H. C., U. S. A. 1912
Compton, Paul 1912
George, William Rushby, Sgt. 1st Cl. H. C., U. S. A. 1912
Hecht, William, Sgt. 1st Cl. H. C., U. S. A. 1912
Jennings, Harry Milton 1912
Leiblinger, Julius, Sgt. 1st Cl. H. C., U. S. A. 1912
Rosevelt, Theodore Edward, Sgt. 1st Cl. H. C., U. S. A. 1912

DOMINION OF CANADA.

MANITOBA.

Winnepeg.

Bletcher, Henry Ernest John... 1904
Campbell, Charles William 1910
Colcleugh, Murray Chisolm 1913
Nesbitt, Evelyn 1910

NOVA SCOTIA.

Halifax.

Simson, Francis Cook 1876

ONTARIO.

Guelph.

Stewart, Alexander 1905

Ottawa.

Watters, Henry 1912

Picton.

Case, Edmund Wendell 1912

Stratford.

Waugh, George James 1862

Toronto.

Heebner, Charles Frederick ... 1894

QUEBEC.

Montreal.

Morrison, Joseph Edward 1888

Three Rivers.

Williams, John Lewis, Doctor Optics 1905

MEMBERS RESIDING IN FOREIGN COUNTRIES (*except Canada*).

Abreu, Gerardo Fernandez, Havana, Cuba 1907
Adan, Francisco Varcla, Camaguey, Cuba 1911
Aggan, Elias Georges, Tanta, Egypt 1913
Baum, Fred Christ, San Juan, Porto Rico 1911
Beltran, Edwardo J., Santiago de Cuba 1912
Bernstroem, Nils Gustaf, Gotenborg, Sweden 1906
Biosca, Placido, M.D., D.Sc., Pharm.D., Prof., Havana, Cuba 1907
Bosque, Arturo, Havana, Cuba 1907
Capote, Jose, Havana, Cuba 1907
Carballo, Christobal T., Isle of Pines, Cuba 1911
Carballo, Emilio Trillo, Isle of Pines, Cuba 1911
Carbonell, Francisco J., Yaguajay, Cuba 1912
Cartaya, Julio Hernandez, Havana, Cuba 1907
Cuervo, Adolfo, Havana, Cuba 1907
Curquejo, Antonio Gonzales, Havana, Cuba 1907
Delgado, Joseph D., Ph.C., Private 1st Cl., U. S. A., Colon, Panama ... 1913
Diaz, Jose Guillermo, Havana, Cuba 1907
Diaz, Joseph Macias, Havana, Cuba 1913
Donestevez, Juan, Palmira, Cuba 1911
Famayo, Jose A., Manzanillo, Cuba 1911
Foledo, Eladjo M. G., Havana, Cuba 1911
Gallardo, Basilo Gomez, Holgium, Oriente, Cuba 1911
Garcia, Jose Ramon R., Havana, Cuba 1912
Gatell, Manuel R., Cienfuegos, Cuba 1911
Gibson, Frank L., Kalawao Molakar, H. I. 1911
Grimany, Frederico, Santiago de Cuba 1912
Hallaway, Robert Railton, B.Sc., Ph.D., Carlisle, England 1905
Hermann, Christopher, Ft. Shafter, Honolulu, H. T. 1912
Herrera, Francisco, Havana, Cuba 1907

FOREIGN COUNTRIES.

Jacobs, Charles Christian, Sancti Spiritus, Cuba 1901
Johnson, Manuel, Havana, Cuba 1907
Johnson, Theodore, Havana, Cuba 1911
Joli, Oscar Fenes, Quantaamo, Oriente, Cuba 1911
Jurado, Bolivar, Ph.C., Ph.B., Panama City, Panama 1912
Ladakis, Triantaphylle, Beirut, Syria 1907
Llerena, Maria Gonzalez y, Havana, Cuba 1913
Madrigal, Jorge Quinteso, Clara, Cuba 1912
Martin, Nicholas Henry, Gateshead-on-Tyne, England 1891
Miller, Charles Elliott, Shanghai, China 1899
Morales, Celestino Garcia, Havana, Cuba 1907
Murray, Alexander, San José de Costa Rica 1903
Pando, Pedro G., Ph.G., ex-Pres. Coll. of Pharm. de Costa Rica, Zulueta, Prov. de Santa Clara, Cuba .....
Patch, James Alfred, Bierut, Syria 1903
Perez, Moises, Havana, Cuba 1912
Perez, Ramon Lorenz, Havana, Cuba 1912
Pirie, Alfred Mitchell, Cartago, Costa Rica 1903
Porro, Alvaro, Camaguey, Cuba 1911
Power, Frederick Belding, London, England 1872
Ramirez, Rogelio H., Marianao, Cuba 1912
Rebustillo, Manuel G., Manzanillo, Cuba 1912
Remirez, Prof. Francisco, Havana, Cuba 1912
Sarra, Ernesto, Havana, Cuba 1907
Saunders, William, Ottawa, Canada 1860
Silverio, Francisco Manoz, Havana, Cuba 1912
Sosa, Francisco N., Vedado, Cuba 1912
Taquechel, Francisco, Havana, Cuba 1908
Valdes, Eduardo, Matanzas, Cuba 1907
Wellcome, Henry Solomon, London, England 1875
Wunez, Jorye L., Havana, Cuba 1913

ALPHABETICAL LIST OF MEMBERS.

HONORARY MEMBERS.

Holmes, E. M., F. L. S., 17 Bloomsbury Square, London, W. C., England. 1899
Hooper, David, F. I. C., F. C. S., Indian Museum, 1 Sudder St., Calcutta, India 1899
Meyer, Professor Dr. Arthur, Marburg, Germany 1910
Schaer, Dr. Edward, Professor of Pharm., Pharmaceutisches Instut der Universtät, Strassburg, Germany 1877
Schelenz, Professor Dr. Hermann, Kaiser Str. 53 I Cassel, Germany .. 1912
Schmidt, Professor Dr. Ernst, Geh. Regierunsrath, Marburg, Germany.. 1899
Tschirch, Professor Dr. Alexander, Bern, Switzerland 1910

ACTIVE MEMBERS.*

Members are requested to notify the General Secretary of errors or inaccuracies in the following list. The Association will not replace volumes of Proceedings lost through changes of residence of which the General Secretary has not been notified. See Proceedings, 1866, p. 66.

Abbett, Wm. A.,
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103 San Miguel st., Havana, Cuba.
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1201 State st., Quincy, Ill.
Acheson, Wm. R.,
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Ackermann, A. H., Pharm.D.,
149 Dudley st., Boston, Mass.
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4228 Irving Park Blvd., Chicago, Ill.
Ackerman, John J.,
Hendley, Nebr.
Ackerman, Philip J.,
549 N. High st., Columbus, O.
Adamick, Gustave H.,
189 W. Madison st., Chicago, Ill.
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71 Genesee st., Auburn, N. Y.
Adams, James H.,
Box 164, Sagamore, Mass.
Adams, Walter D., 2nd V.-P. Texas,
Phar. Assn., Forney, Tex.
Adan, Francisco V.,
49 General Gomez, Camaguey, Cuba.
Aggan, Elias Geo.,
Tanta, Egypt.
Aicklen, Henry, S. 1st Cl. H. C., U.S.A.,
826 9th ave., So. Nashville, Tenn.
Alacan, Jose P., Phar.D.,
4523 Chestnut st., Philadelphia, Pa.
Albers, Wm. W.,
301 3rd st., Wausau, Wis.
Alberts, M. Lee,
Lowell, Ind.
Alkire, Lewis L.,
1596 So. Pearl st., Denver, Colo.
Allen, Bertram,
Clearwater Pharm., Clearwater, Fla.
Allen, E. Floyd,
1538 Nicollet ave., Minneapolis, Minn.
Allison, Wm. O.,
100 William st., New York, N. Y.
Alpers, Otto,
282 City Island av., City Island, N. Y.
Alpers, Wm. C.,
495 Columbus av., New York, N. Y.
Alsberg, Carl L., A.B., A.M., M.D.,
3443 14th N. W., Washington, D. C.
Alvino, Ernest E.,
4002 Penn ave., Pittsburgh, Pa.
Amos, Wilber S., 7th & Central sts.,
c. McPike Drug Co., Kansas City, Mo.
Anderson, Carl G.,
413 Division st., Chicago, Ill.
Anderson, Ingewald A., Ph.G.,
Dow City, Ia.
Anderson, Oscar L.,
Commerce & Envoy, Dallas, Tex.
Anderson, Wm. C., Ph.G., Phar.D.,
315 Greene st., Brooklyn, N. Y.
Andrews, Geo. M.,
9 & 11 No. Main st., Woodstown, N. J.
Andrews, Wm. A. P.,
172 Church st., West Haven, Conn.
Anspach, Paul B., Ph.G.,
61 N. 4th st., Easton, Pa.
Anthony, Edwin P.,
178 Angell st., Providence, R. I.
Apmeyer, Chas. A.,
2308 Highland av., Mt. Auburn, Cinn., O.
Apple, Franklin M., Ph.G., Phar.D.,
31st & Berks sts., Philadelphia, Pa.

* List corrected to March 1, 1913.

Appleton, Wm. R.,
Lock Box 162, Warren, Ark.
Arbaugh, Rufus C., Ph.G.,
Jasper, Ark.
Archer, Fred. W.,
1181 Washington st., Dorchester, Mass.
Arias, Ernest,
Field Hosp. No. 4, Ft. McKinley, P.I.
Armstrong, Thos. S., Ph.G.,
Park & North aves., Plainfield, N. J.
Arnold, Wm. C.,
Houtzdale, Pa.
Arny, Harry V., Ph.G., Ph.D.,
115 W. 68th st., New York, N. Y.
Ashbrook, Chas. S.,
Main & 4th sts., Mansfield, O.
Asher, Philip,
1606 St. Charles av., New Orleans, La.
Ashim, Barach J.,
610 3rd st., San Francisco, Cal.
Austin, Arthur O., Pharm.D.,
P. O. Block, Main st., Orleans, Vt.
Austin, Frank A.,
2400 Colfax ave., Denver, Colo.
Avery, Chas. H.,
5460 Ridgewood st., Chicago, Ill.
Averyt, Henry M.,
426 Baldwin ave., Detroit, Mich.
Avis, James L.,
83 So. Main st., Harrisonburg, Va.
Babcock, Percival W.,
71 Lisbon st., Lewiston, Me.
Bachman, Gustav,
Minn. Coll. Phar., Minneapolis, Minn.
Backus, Edwin J.,
2403 W. North ave., Chicago, Ill.
Baer, Edward A.,
1405 Call Bldg., San Francisco, Cal.
Baer, Jacob M.,
2000 Chestnut st., Philadelphia, Pa.
Bagley, Anna G.,
48 E. Patterson ave., Columbus, O.
Baigent, John, Sgt. 1st Cl. H. C., U.S.A.
Columbus Barracks, Columbus, O.
Bailey, Frederick,
142 1st st., Lowell, Mass.
Bailey, John A.,
738 14th st., Denver, Colo.
Baillie, James,
1887 Rondo st., St. Paul, Minn.
Baker, Edwin,
34 Bridge st., Shelburne Falls, Mass.
Baker, W. N.,
400 Neponset ave., Boston, Mass.
Ball, Alice A., Ph.C.,
2401 East Union st., Seattle, Wash.
Ballagh, Wilfred T.,
S. E. Cor. Square, Nevada, Mo.
Ballard, Chas. W., Ph.C., Phar.D., M.A.,
115 W. 68th st., New York.
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ERRATA.

Page 125—3rd paragraph from bottom of page, beginning of 1st line: read "Achijodine," not "Acijodin."

Page 131—2nd paragraph, 1st line: read "aethylendiamine," not "aethyleudiamine."

Page 143—2nd paragraph, 2nd line: read "technique," not "techique."

Page 182—3rd paragraph, end of first line: read "reviews," not "revises."

Page 224—2nd line from top: read "Sapote," not "Lapote."

Page 231—8th line from top: read "Bolivianum," not "Bolivanum."

Page 330—Top line, 1st word: read "blende," not "blend."

Page 334—Last paragraph, 1st line, after Germanium: read "Extraction," not "Extracted."

Page 358—Caption between 1st and 2nd paragraphs: read "Derivatives," not "Derivation."

Page 359—2nd paragraph from bottom, 1st line: read "preparation," not "presentation."

Page 369—3rd line from bottom: read "farnesol," not "farnerol."

Page 375—3rd paragraph, 3rd line: read "Cymbopogon," not "Cymbopogan."

Page 441—Top line after $C_{18}H_{34}O_2$: read "elaïdic," not "gaeïdic."

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